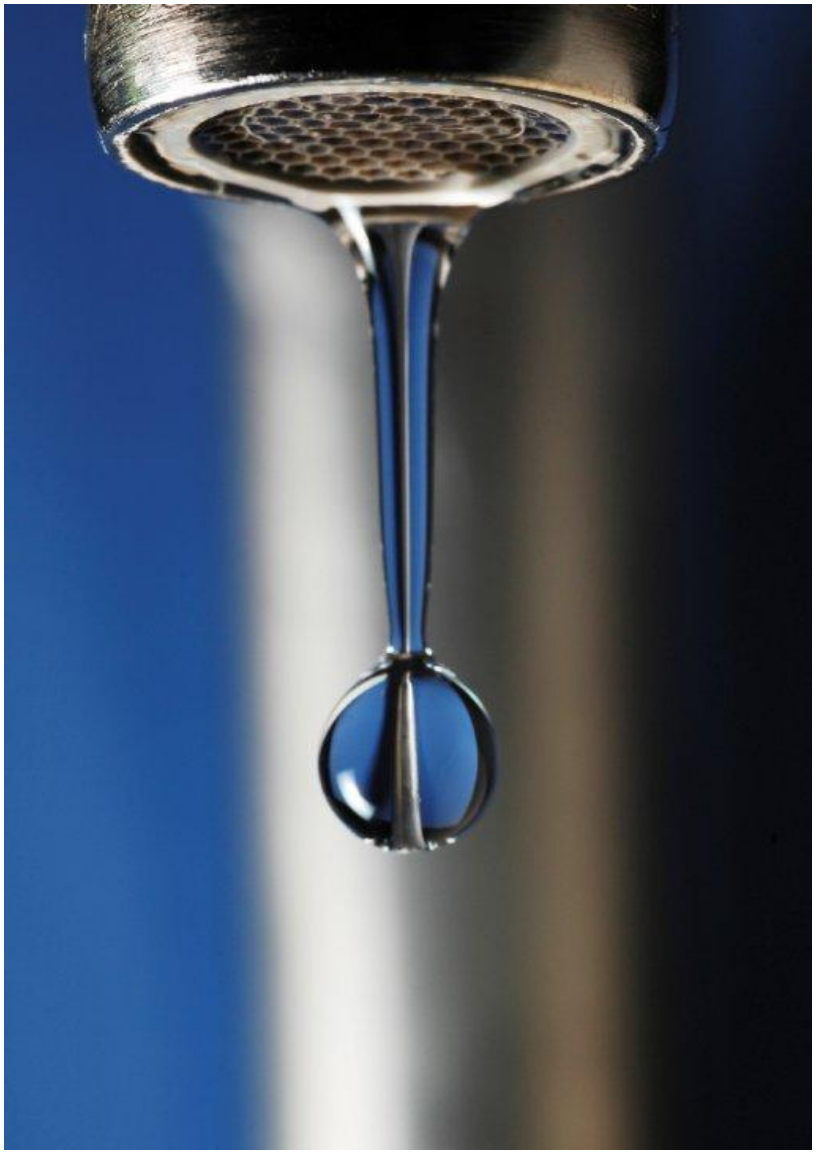
GIPPSLAND WATER



Gippsland Water
2012-13 Annual Report on Drinking Water Quality

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1 INTRODUCTION

1.1 CHARACTERISATION OF THE SYSTEM

The Central Gippsland Region Water Corporation, trading as Gippsland Water, was constituted on 21 December 1994 under the *Water Act 1989*.

Gippsland Water is the second largest regional water corporation in Victoria in terms of revenue earned and is the largest in terms of the total volume of water supplied and wastewater collected. It manages;

- 16 water treatment plants;
- 14 wastewater treatment plants and;
- two ocean outfalls.

Gippsland Water provides water and wastewater services to customers in the central Gippsland region of Victoria. Its geographic region stretches from Drouin in the west to Stratford in the east, and from Mirboo North in the south to Rawson and Briagalong in the north.

Gippsland Water manages five business streams, one of which is the provision of water services. Its region consists of;

- 42 towns;
- approximately 65,202 properties connected to the 16 drinking water supply systems.

These towns are grouped into 35 localities for the purposes of monitoring and reporting in accordance with the Safe Drinking Water Regulations 2005 (SDWR).

Gippsland Water is committed to providing responsible asset management, quality management, incident management and operational audit of the reticulated urban water supply system to ensure that customer service levels are achieved according to its Customer Charter targets and the *Safe Drinking Water Act 2003 (SDWA)*.

A major objective for the corporation is to achieve and maintain community confidence in the safety, reliability and quality of their water supply.

Our mission

We will manage the resources in our care in a manner that secures social, environmental and economic benefits to our customers, stakeholders and the Gippsland region.

Our vision

We will deliver value in sustainable water and waste management within central Gippsland.

2 DRINKING WATER QUALITY MANAGEMENT FRAMEWORK

The regulatory environment in which Gippsland Water operates is to provide safe drinking water at **all** times. Safe drinking water is water that does not cause illness in those who consume it. To achieve this, the water must be free of pathogens and free of harmful chemicals.

The regulatory environment that provides guidance in the production of safe drinking water consists of:

- ***Victorian Safe Drinking Water Act 2003 (SDWA)***

The Victorian State Government passed the **Safe Drinking Water Act** in June 2003. This Act provides details of further requirements for Victorian Water Corporations.

The purpose of the Safe Drinking Water Act (2003) is to make provision for the supply of safe drinking water. In outline this Act:

- requires water suppliers and water storage managers to prepare and implement plans to manage risks in relation to drinking water and some types of non-potable water;
- provides for the auditing of those plans by approved auditors;
- requires water suppliers to ensure that the drinking water they supply meets quality standards specified by the regulations;
- requires water suppliers to disclose to the public information concerning the quality of drinking water;
- provides for the variation, after community consultation, of water quality standards that relate only to aesthetic factors;
- requires the reporting of known or suspected contamination of drinking water to the Secretary to the Department of Health;
- empowers the Secretary to enforce this Act.

- ***Victorian Safe Drinking Water Regulations 2005 (SDWR)***

The Victorian State Government passed the **Safe Drinking Water Regulations** in July 2005. This act provides details of further requirements for Victorian Water Corporations.

The purpose of the Safe Drinking Water Regulations (2005) is to make provision for the supply of safe drinking water. In outline this Act:

- set out the further matters to be addressed in risk management plans and the risks to be specified in risk management plans
- describe the documents that are to be available for inspection in the risk management plan audit;
- prescribe the form of audit certificates to be given to the person who has commissioned a risk management plan audit at the completion of the audit;
- set out the risk management plan auditor approval criteria
- set out the drinking water standards;
- set out the requirements relating to the frequency of collection of samples of water quality analysis;
- empowers the Secretary to:
  (i) divide areas supplied by water suppliers into water sampling localities;

(ii) specify locations within a water sampling locality at which samples of water are to be collected;
(iii) vary the frequency of collection for samples of water in certain circumstances;
(iv) approve persons to be water analysts;

- require all samples of water collected to be analysed by an approved water analyst and a summary of results of the analysis to be given to the secretary;
- specify the issues relating to the quality of drinking water, in an annual report in respect of every financial year to be given to the Secretary by a water supplier and water storage manager;
- set out details to be included in an annual report to the secretary referred to in sub-regulation (2)(i).

- ***Australian Drinking Water Guidelines 2011 (ADWG)***

The purpose of the Australian Drinking Water Guidelines 2011 is to 'provide the authoritative reference for use within Australia's administrative and legislative framework to ensure the accountability of drinking water suppliers. The ADWG are not, however, mandatory, legally enforceable standards.

The guidelines set the framework for the management of drinking water quality known as the 12 elements

The ADWG 12 elements comprise:

1. Commitment to Drinking Water Quality Management.
2. Assessment of the Drinking Water Supply System.
3. Preventive Measures for Drinking Water Quality Management.
4. Operational Procedures and Process Control.
5. Verification of Drinking Water Quality.
6. Management of Incidents and Emergencies.
7. Employee Awareness and Training.
8. Community Involvement and Awareness.
9. Research and Development.
10. Documentation and Reporting.
11. Evaluation and Audit.
12. Review and Continual Improvement

- **Code of Practice for Fluoridation of Drinking Water Supplies 2009**

The Department of Human Services released the **Code of Practice for Fluoridation of Drinking Water Supplies** in March 2009.

This code provides details of further requirements for Victorian Water Corporations.

The objective of the code is to provide for safe and effective addition of fluoride into the drinking water supply.

This will be achieved by specifying:

(a) the optimum fluoride levels for drinking water supplies and the design control limits for fluoridation plants
(b) the minimum requirements for the safe and effective addition of fluoride chemicals to drinking water supplies, covering the design and operation of a fluoridation plant
(c) monitoring and reporting requirements for the proposed fluoridation scheme

The code also includes works undertaken on fluoridation plants and integrates the practices with the SDWA through:

(a) the inclusion of water fluoridation into the corporations' risk management plan under the SDWA
(b) integration and compliance with the auditing, notification and reporting requirements of the SDWA

The code also describes the gap analysis and subsequent works program associated with water fluoridation plant by;

(a) the regulatory frame work including the procedure to fluoridate
(b) safety in design
(c) requirements for the design and control of fluoridation facilities
(d) requirement for plant operation including monitoring, training or personnel, occupational health and safety, security and environmental protection

3 DRINKING WATER SUPPLY SYSTEMS

3.1.1 Map of the Gippsland Water system

Figure 1: Overview of water supply system operated by Gippsland Water

3.1.2 Source of water

Gippsland Water operated 16 water treatment systems supplying 35 water sampling localities and 42 towns in 2012-13. The water for these systems is sourced from a variety of water supplies including stream off-takes, reservoirs, and groundwater (bore water). The table below provides information on where the raw water is sourced for each water sampling locality, identifies the raw water storage (if one exists prior to each water treatment plant) and details the water treatment processes used to produce safe drinking water.

Table 1: Gippsland Water Locality Water Source and Water treatment process

Locality	Population[1]	Source water	Raw Water Storage	Water Treatment Plant	Treatment process										Sludge Thickening Dewatering	Added Substances					
						Clarification		Filtration		Disinfection				Other							
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC/GAC)[4]		Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride[2]/ Hydrofluorosilicic Acid
Maffra	5390	Macalister River	N/A	Maffra	X	X		X		X		Stratford & Boisdale		X		Soda Ash	Alum / PACl-23* (High Turbidity)		X	LT22	Hydrofluorosilicic acid
Stratford	2130																				
Boisdale	90																				
Briagolong	930	Bore (Freestone Creek Aquifer)	N/A	Briagolong	X			X				X				Soda Ash		Polymerised Ferric Sulphate		1115 & 1160	

- 1 = The listed populations are for the water sampling localities calculated using 2006 census data to calculate the number of persons per dwelling per locality and then multiplying it with Gippsland Water's 2012-13 figures for number of connections. Figures have also been rounded to the nearest 10.
- 2 = Sodium Fluoride - (dissolvable PVA bag)
- 3 = The water supplied to Darnum changed from the Warragul System to the Moe System in March 2012.
- 4 = PAC/GAC used as required to treat for taste and odour compounds
- * = PACl-23 used as required to treat high turbidity raw water
- X_1 = Plant capability for activated carbon dosing (not currently in use)

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					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC/GAC)[4]		Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride[2]/ Hydrofluorosilicic Acid
Morwell	16540	Tyers River	Moondarra	Morwell	X	X		X		X		Morwell, Chruchill, Jumbuk, Hazelwood Nth, Boolarra	Traralgon Sth		X	Soda Ash	Alum			LT20	Sodium Fluoride
Boolarra	710																				
Churchill	5420																				
Yinnar	1100																				
Jumbuk	380																				
Traralgon South/Hazelwood North	2370																				
Tyers/Glengarry	2290	Tyers River	Moondarra	Tyers (Plant 1)	X			X				Tyers, Rosedale & Toongabbie			X	Soda Ash	Alum			1115 & 1160	
Rosedale	1850																				
Toongabbie	960			Tyers (Plant 2)	X	X	X	X	X												
Cowwarr	370																				
Traralgon	29490	Tyers River	Moondarra	Traralgon	X		X	X		X		X			X	Soda Ash	Alum			LT20	Sodium Fluoride

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Warragul (including Nilma, Darnum[3], Drouin East)	16210	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	Warragul	X		X	X		X		Warragul South & Drouin		X_1	X	Lime	Alum			LT20	Sodium Fluoride
Warragul South	820																				
Drouin	11000																				
Rokeby/Buln Buln	490																				
Coongulla/ Glenmaggie	310	Macalister River	Lake Glenmaggie	Coongulla	X			X				X		X	X	Soda Ash	Alum 90			1190, 1115	
Rawson	350	Trigger Creek	Amours Basins	Rawson	X		X	X				Rawson WTP, Parkers Corner			X	Soda Ash		Ferric Chloride		1160	
Erica	230																				
Heyfield	2130	Thomson River	Heyfield Raw water storage	Heyfield	X			X		X				X_1	X	Soda Ash	Alum 90 (for poor water quality)	PFS (Polymerised Ferric Sulphate)		1115, 1160	

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Mirboo North	1980	Little Morwell River	N/A	Mirboo North	X	X	X	X		X		Basin			X	Soda Ash	PASS			LT20	
Moe	11510	Tanjil River and Narracan Creek	N/A	Moe	X	X		X		X		Newborough, Yallourn North, Trafalgar, Yarragon & Darnum			X	Soda Ash, Lime	Alum			LT20	Sodium Fluoride
Newborough	7250																				
Yallourn North	1590																				
Trafalgar	3700																				
Yarragon	1450																				
Darnum[3]	20																				
Neerim South	1460	Tarago River	Tarago Reservoir	Neerim South	X			X			X (Noojee System)	X (Neerim South)			X	Soda Ash		PFS (Polymerised Ferric Sulphate)		1115, 1160	
Noojee	350																				
Sale/Wurruk	17080	Bore (Boisdale Aquifer)	N/A	Sale				X		X						Lime			X		Sodium Fluoride

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Seaspray	240	Merrimans Creek	N/A	Seaspray	X			X				X			X	Soda Ash	Alum 90			1115, 1160	
Thorpdale	240	Easterbrook Creek	Thorpdale raw water storage	Thorpdale	X			X				X			X	Soda Ash	Alum				
Willow Grove	360	Tanjil River	Blue Rock Lake	Willow Grove	X			X			X				X	Soda Ash	Alum			1115, 1160	

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- X_1 = Plant capability for activated carbon dosing (not currently in use)

3.2 WATER TREATMENT PROCESSES

Gippsland Water operates 16 water supply systems, with 16 water treatment plants (WTP), supplying 35 localities (42 towns).

The source waters are treated prior to distribution to Gippsland Water's customers with the objective of providing safe drinking water at all times. The treatment varies for each water supply system with the specific treatment process dependent on the quality and risks of the source water.

Table 1 identifies the regular treatment process for each of the water localities and lists the added substances and any periodic treatment activities.

The corporation uses the following treatment processes to produce safe drinking water.

3.2.1 Lime / Soda Ash Addition

To ensure the pH level in the raw water (before treatment chemicals are added) and filtered water (after treatment) is within the required ranges, lime or soda ash is added. Lime or soda ash is added to the raw water to adjust the pH to ensure the optimum level for chemical reactions to occur in the coagulation / flocculation process.

Lime or soda ash is also added to the water before it leaves the water treatment plant to maintain the pH in the desired range to optimise the effectiveness of disinfection chlorinated systems and to minimise the risk of corrosion and improve water taste.

3.2.2 Coagulation / Flocculation

Coagulation is a process to remove very fine suspended particles often associated with turbidity, colour or colloidal matter in water. These particles have a negative charge that causes them to repel each other and stay suspended in water. The addition of a suitable 'coagulant' of iron and/or aluminium salt with a positive charge neutralises or destabilises the negative charge enabling the fine particles to join together to form larger particles. The flocculation (floc) process involves stirring the water gently after the coagulant has been added. This allows the particles to come into contact, and eventually causes it to stick together and form floc. This process removes the fine particles, dirt and colour present in the water.

3.2.3 Clarification / Sedimentation

The clarification or sedimentation of the floc materials is usually carried out under still conditions (e.g. in the sedimentation tank or clarifier). A sedimentation tank relies on gravity to separate the floc from the water, which is heavy and falls to the bottom of the tank – leaving the 'cleaner' water on top. A clarifier uses a mechanical process to separate the floc, and the water is collected in troughs at the surface. Once the floc has been removed the clean water is sent to filters.

3.2.4 Membrane Filtration

Membrane filtration is used to remove suspended solids and some colloidal matter from the source water. The water is pumped through the filter membrane trapping suspended solids in the process. The concentrate (material that does not pass through the membrane) is periodically removed to waste to prevent the blocking of the membrane filters.

3.2.5 Filtration

The clarified water is passed through a filter consisting of several types of graded filter media (sand, gravel and coal) to remove any remaining particles, floc or dissolved chemicals that may have passed through the clarification/sedimentation process.

Another method used utilises Dissolved Air Flotation and Filtration (DAFF) which relies on the injection of microscopic air particles into the water stream, causing the flocculated particles to float to the surface. These particles are then drawn off the surface and off the filtration tank and removed to waste. The clear water then is filtered, as above, through graded filter media.

Over time, the filters gradually become clogged with trapped particles. A filter backwash is carried out to clean the filters, returning it to optimum condition. Air and water is forced up through the filter nozzles to agitate the filter bed and remove any trapped particles. The final turbidity of water leaving the filters, during normal plant operation, is less than 0.1 NTU (unit of measure for turbidity).

The backwash water produced during the filter cleaning process is discharged to the sludge thickening system to separate solids from process water. To maximise water use, the separated process water is then returned to the treatment plant and mixed with new raw water to recommence the treatment process.

3.2.6 Disinfection

Drinking water is disinfected to prevent the spread of waterborne pathogens that cause diseases such as dysentery, cholera, typhoid and gastroenteritis.

A low residual level of disinfection also ensures that the water remains disinfected once it leaves the water treatment plant until it arrives at the customer's tap.

In Gippsland Water's service area, chlorination is the most commonly used disinfectant because of its reliability and cost effectiveness. Chlorine is the most widely used disinfectant for water supplies in the world. The other disinfection treatment processes used in our region is chloramination.

3.2.7 Fluoridation

Gippsland Water fluoridates the drinking water supplies of Moe, Morwell, Maffra Traralgon, Sale, and Warragul. For information about the health issues associated with the water fluoridation program contact the Department of Health (DH) on 1800 651 723.

3.3 SYSTEM ISSUES FOR 2012-13

During the 2012-13 monitoring period, the following issues occurred in the Gippsland Water -water supply system;

- Traralgon reticulation water – treatment process failure resulting in elevated acid soluble aluminium exceedance in a localised area. (December 2012)
- Thorpdale reticulation system – one positive *E.coli* result identified in the Thorpdale system (June 2013)

These events were reportable under Section 22 of the SDWA and as such are detailed in Section 5 of this report.

4 QUALITY OF DRINKING WATER 2012-13

The SDWR require a water quality monitoring program to be undertaken to verify compliance or non-compliance of specified water quality parameters as listed in the regulations. The quality of water is to be measured at a customer's tap in each of the 35 localities to determine that the water meets the specified quality standard. Over the reporting period, approximately 4,000 samples were collected for quality testing. The following section provides a summary of the results against the water quality parameters monitored through the year at the required sampling frequency.

A brief explanation of the required water quality parameters is provided below. A more detailed explanation can be obtained from the ADWG prepared by the National Health and Medical Research Council.

4.1 QUALITY PARAMETERS

***Escherichia coli* (*E. coli*) –** *E. coli* is the most common thermo tolerant coliform present in faeces and is regarded as the most specific indicator of recent faecal contamination from warm blooded animals. The presence of *E. coli* in the water supply can therefore indicate the potential for other pathogenic bacteria to be present. Any *E. coli* detections at customer tap samples must be reported to DH under SDWA reporting requirements.

Chloroacetic, Dichloroacetic and Trichloroacetic Acid – These chloroacetic acids are produced in drinking water as by-products of the reaction between chlorine and naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter, present in water supplies. Results from samples taken at customer taps that exceed the maximum levels for these parameters are reported to the DH under SDWA reporting requirements.

Trihalomethanes (THM) – Trihalomethanes are a category of by-products produced in drinking water, principally as a result of disinfection chemicals (chlorine) reacting with naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter, present in water supplies. Results from samples taken at customer taps that exceed the maximum levels for these parameters are reported to DH under SDWA reporting requirements.

Acid Soluble Aluminium – Aluminium concentrations may be present in water through natural leaching from soil and rock, or from the use of aluminium salts as coagulants in water treatment. The naturally occurring aluminium concentrations are removed using conventional water treatment practices. "Acid soluble aluminium" is the biologically available fraction of aluminium present in water. Results from samples taken at customer taps that exceed the maximum level of this parameter are reported to DH under SDWA reporting requirements.

Turbidity – Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles, algae and other microscopic organisms in the water. In high levels, this matter gives the water the appearance of being dirty, muddy or milky. Turbidity is best removed by coagulation and filtration treatment processes.

Results from samples taken at customer taps that exceed the maximum level of this parameter are reported to DH under SDWA reporting requirements.

5 EMERGENCY/INCIDENT MANAGEMENT

5.1 EMERGENCY/INCIDENT MANAGEMENT

Gippsland Water has aligned its incident/emergency management approach to the Australasian Inter-service Incident Management Systems (AIIMS) as part of its SDWA and SDWR emergency and incident management processes.

5.2 INCIDENTS AND POTENTIAL WATER QUALITY EVENTS

Section 18 of the SDWA states

'A water supplier must notify the secretary in writing if it becomes known that the drinking water it is supplying to another person does not comply, or is not likely to comply, with any relevant water quality standard and must do so within 10 days after it becomes aware of the fact'

In 2012-13, there was a single water quality incident reported to the DH pursuant to section 18 of the SDWA.

This related to the detection acid soluble aluminium in the Rawson system. The notification occurred due to the acid soluble aluminium not complying with the limits detailed in Schedule 2 of the SDWR. Details of this incident are provided under section 8.4 of this report.

5.3 EMERGENCIES AND WATER QUALITY EVENTS

Section 22 of the SDWA states

'(1) This section applies if an officer of a water supplier believes or suspects on reasonable grounds that the water supplied, or to be supplied for drinking purposes –

a. may be the cause of illness; or
b. may be the means by which an illness is being, has been or will be transmitted; or
c. may contain any pathogens, substance, chemical or blue-green algae toxin, whether alone or in combination, at levels that may pose a risk to human health; or
d. may be the cause of widespread public complaint

'(2) On forming that belief or suspicion, the officer must immediately report his or her belief or suspicion to the Secretary, and must make the report in the form required by the Secretary.'

During the reporting year there were two reportable events that required notification to the Drinking Water Regulatory Unit of DH, under section 22 of the SDWA.

In 2012-13, the water quality events reported to the DH pursuant to section 22 of the SDWA are summarised below. For further details on actions taken in response to these incidents, please refer to section 8.

Table 2: Summary of incidents and actions taken under Section 22

Locality	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident	Was the community notified
Traralgon	December 2012	Traralgon Water Reticulation	Treatment Failure/Dirty Water (Acid Soluble Aluminium)	Traralgon Water Reticulation	Department of Health (DH) Notification under section 22 SDWA. Alum syphoned into raw water line during plant raw water line shutdown. On restarting the plant a slug of high aluminium water pass through the treatment process. Duration of the flow of high aluminium water was insufficient to trigger the coagulation pH alarm (alarm delay was not activated) Extensive flushing undertaken throughout the reticulation network and additional monitoring of water quality parameters undertaken during and after the event. Alarm delays and protocols worked as configured and a review of alarm delays undertaken for completeness. No changes were made. All subsequent reticulation monitoring was compliant.	No
Thorpdale	June 2013	Thorpdale Water Reticulation	*E. coli* detected in drinking water (1 organism/ 100mL)	Thorpdale Water Reticulation	Department of Health (DH) Notification under section 22 SDWA. Extensive flushing undertaken throughout the reticulation network and additional monitoring of water quality parameters undertaken during and after the event. All subsequent reticulation monitoring was compliant. Refresher training of sampling staff undertaken and overhanging vegetation removed from sample site	No

5.3.1 Other Events Not Reportable

During the reporting period, heavy rains affected the Gippsland region resulting in a deterioration of raw water quality. The treatment process in place throughout Gippsland Water service area continued to produce safe drinking water. No water treatment assets were impacted by flood water during the reporting period.

Also occurring during the reporting period was the Aberfeldy / Heyfield bush fires. High demands were placed on the water supply systems during this time in the Townships of Heyfield, Coongulla, Glenmaggie, Briagolong, Boisdale, Cowwarr, Toongbbie and Glengarry. Throughout this time water supply was maintained and testing showed quality was not compromised.

A) On 17th December 2013, local media detailed an account of a dead cow in the Macalister River immediately upstream of the Maffra Water Treatment Plant. Although posing no risk to the water supply of the residents of Maffra, Stratford & Boisdale due to the multiple barrier approach to water treatment undertaken at the Maffra Water Treatment Plant, the Department of Health was advised as a matter of course.

There were no other events to note for the reporting period of 2012-13

6 COMPLAINTS

6.1 WATER QUALITY COMPLAINTS

A summary of customer complaints received by Gippsland Water relating to the quality of drinking water supplied is reported below.

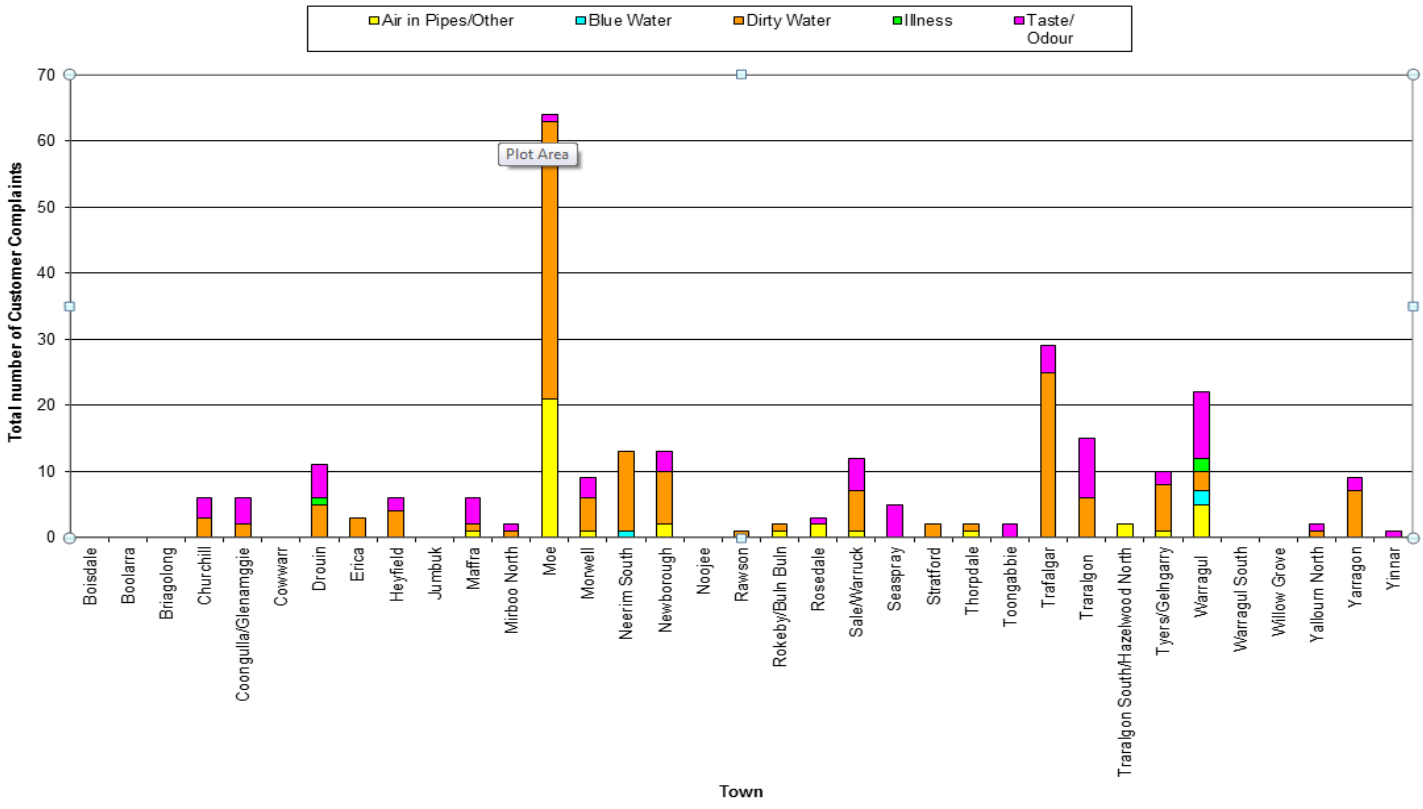
Gippsland Water records and reports on customer complaints relating to dirty water, taste and odour problems, suspected illness/health concerns, blue water, and appearance of air-filled or "white" water received from the tap.

Table 2: Water quality complaints per 100 customers supplied

Type of Complaint	2012-13		2011-12	2010-11	2009-10
	No. of Complaints	Complaints per 100 customers	Complaints per 100 customers	Complaints per 100 customers	Complaints per 100 customers
Discoloured water	146	0.224	0.328	0.148	0.192
Taste / odour	68	0.104	0.294	0.090	0.075
Blue water	3	0.005	0.002	0.000	0.009
Air in water	38	0.058	0.075	0.032	0.043
Alleged illness	3	0.005	0.015	0.005	0.002
Total	258	0.396	0.715	0.276	0.321

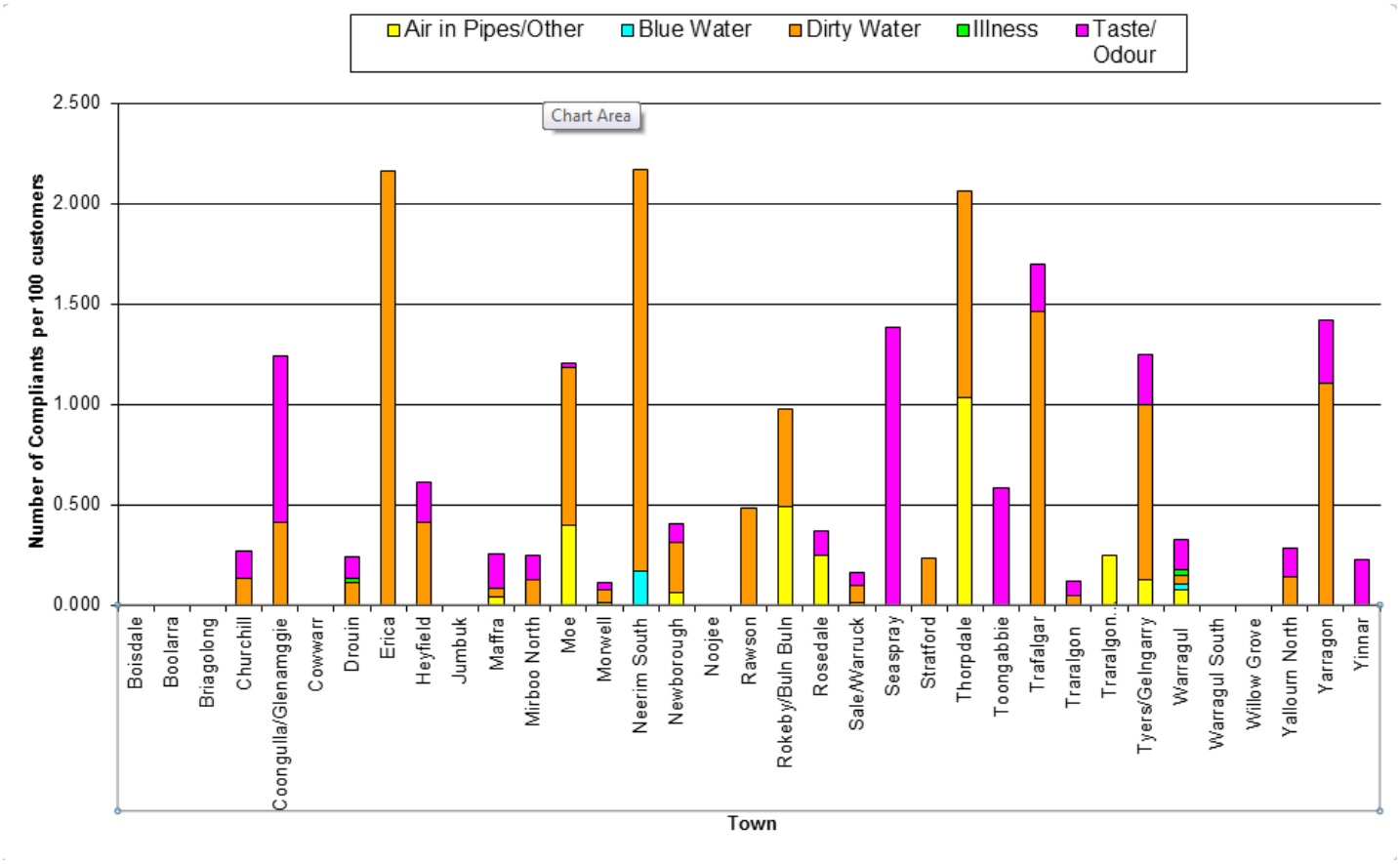
The total number of complaints received by Gippsland Water was lower for the 2012-2013 reporting period than the previous year. The results are presented below by type and locality.

Figure 2: Total Customer Complaints for 2012-13



When calculating the number of complaints per 100 customers, there were no localities within Gippsland Water's supply district which exceeded 4 complaints per 100 customers, as represented in the figure below.

Figure 3: Customer Complaints per 100 customers for 2012-13



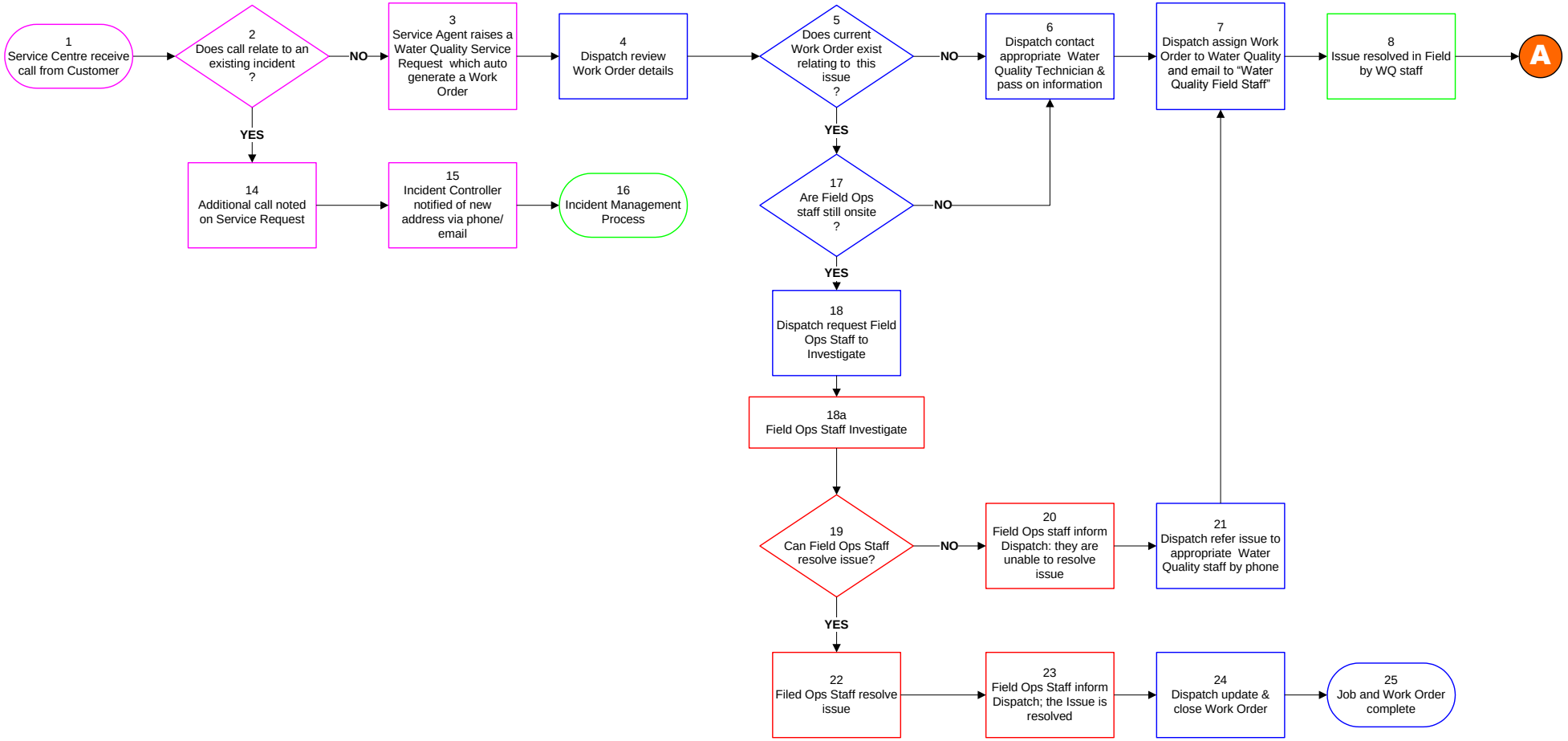
6.2 A SUMMARY OF THE CUSTOMER COMPLAINT PROCESS

Customer complaints are managed according to the following summary procedure:

- Customer complaints received by Gippsland Water's Service Centre are recorded in a database. Details include information of who, where, time and nature of complaint.
- The Water Quality Group investigates by visiting the site and contacting the customer if necessary to determine details of the water quality problem.
- For complaints associated with taste and odour, dirty water, and air in pipes, field measurements are performed, the reticulation system is typically flushed then field measurements are taken again to verify the problem has been corrected.
- Follow up contact may be made with the customer to determine if they are satisfied with the quality of service or alternatively a standard Gippsland Water contact card is left with the customer. This also encourages customers to keep Gippsland Water informed of any reoccurrence of water quality problems.
- Details of actions undertaken are entered into a database to provide a record/history of the site, to document issues for maintenance programs, and to inform capital upgrade requirements where a history of system failures occurs.

This procedure is presented in more detail in the figure below.

Figure 4: Water Quality Complaints Resolution Procedure



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7 RISK MANAGEMENT PLAN AUDIT

Gippsland Water's Water Quality Risk Management Plan has been operational since 2005 and adopts the 12 elements outlined in the ADWG and preventative risk management strategies outlined in the SDWA.

In March 2012 Gippsland Water's Water Quality Risk Management Plan was audited by the DH approved auditor for compliance with section 7(1) of the SDWA. The audit also identified that opportunities identified in the previous audit (December 2009) had been satisfactorily addressed.

The March 2012 audit for the audit period 1 April 2010 to 29 March 2012 confirmed that Gippsland Water complied with the obligations of the SDWA, with eight opportunities for improvement identified (Table 21).

Gippsland Water developed an action plan and has address the eight opportunities for improvement during the 2012-13 reporting period.

The next risk management plan audit period occurs between September 2013 and April 2014.

8 WATER QUALITY RESULTS FOR 2012-13

8.1 *ESCHERICHIA COLI* (*E. COLI*) RESULTS

8.1.1 *E. coli* results

Compliance under the SDWR requires at least 98% of all samples of drinking water collected within a locality in any 12 month period to contain no *E. coli* organism/100ml of drinking water. Most Gippsland Water localities, with the exception of Jumbuk, achieved compliance with this standard for the 2012-13 reporting period.

Table 3: *E. coli* results for localities 2012-13

Locality	Frequency of sampling	No. of samples*	No. of Non complying results	Max result (organisms/ 100mL)	% with no *E. coli*	Complying (Yes/No)
Boisdale	Weekly	52	0	0	100%	Yes
Boolarra	Weekly	52	0	0	100%	Yes
Briagolong	Weekly	52	0	0	100%	Yes
Churchill	Weekly	52	0	0	100%	Yes
Coongulla-Glenmaggie	Weekly	52	0	0	100%	Yes
Cowwarr	Weekly	52	0	0	100%	Yes
Drouin	Weekly	65*	0	0	100%	Yes
Erica	Weekly	52	0	0	100%	Yes
Heyfield	Weekly	52	0	0	100%	Yes
Jumbuk	Weekly	52	0	0	100%	Yes
Maffra	Weekly	52	0	0	100%	Yes
Mirboo North	Weekly	52	0	0	100%	Yes
Moe	Weekly	104*	0	0	100%	Yes
Morwell	Weekly	78*	0	0	100%	Yes
Neerim South	Weekly	52	0	0	100%	Yes
Newborough	Weekly	52	0	0	100%	Yes
Noojee	Weekly	52	0	0	100%	Yes
Rawson	Weekly	52	0	0	100%	Yes
Rokeby-Buln Buln	Weekly	52	0	0	100%	Yes
Rosedale	Weekly	52	0	0	100%	Yes
Sale-Wurruk	Weekly	79*	0	0	100%	Yes
Seaspray	Weekly	52	0	0	100%	Yes
Stratford	Weekly	52	0	0	100%	Yes
Thorpdale	Weekly	52	1**	1	98.1%	Yes
Toongabbie	Weekly	52	0	0	100%	Yes
Trafalgar	Weekly	51	0	0	100%	Yes
Traralgon	Weekly	104*	0	0	100%	Yes
Traralgon South-Hazelwood North	Weekly	52	0	0	100%	Yes
Tyers-Glengarry	Weekly	52	0	0	100%	Yes
Warragul	Weekly	78*	0	0	100%	Yes
Warragul South	Weekly	52	0	0	100%	Yes
Willow Grove	Weekly	52	0	0	100%	Yes
Yallourn North	Weekly	52	0	0	100%	Yes
Yarragon	Weekly	52	0	0	100%	Yes
Yinnar	Weekly	52	0	0	100%	Yes

* The number of samples collected in a locality is determined by the *ADWG* recommendations (Section 10-5) regarding population-based sampling frequency for *E. coli*. Localities with populations greater than 5,000 have samples taken more frequently than weekly.

** One sample collected during the reporting period recorded positive results for *E. coli* at a customer tap, Under the reporting guideline,. A single positive result for *E. coli* with a percentage compliance 98.1% is greater than the compliance requirement of 98% which still meets the 100% SDWR compliance requirements.

8.1.2 Actions taken in relation to non-compliance

During the 2012-13 reporting period, one water sampling localities recorded positive *E. coli* results.

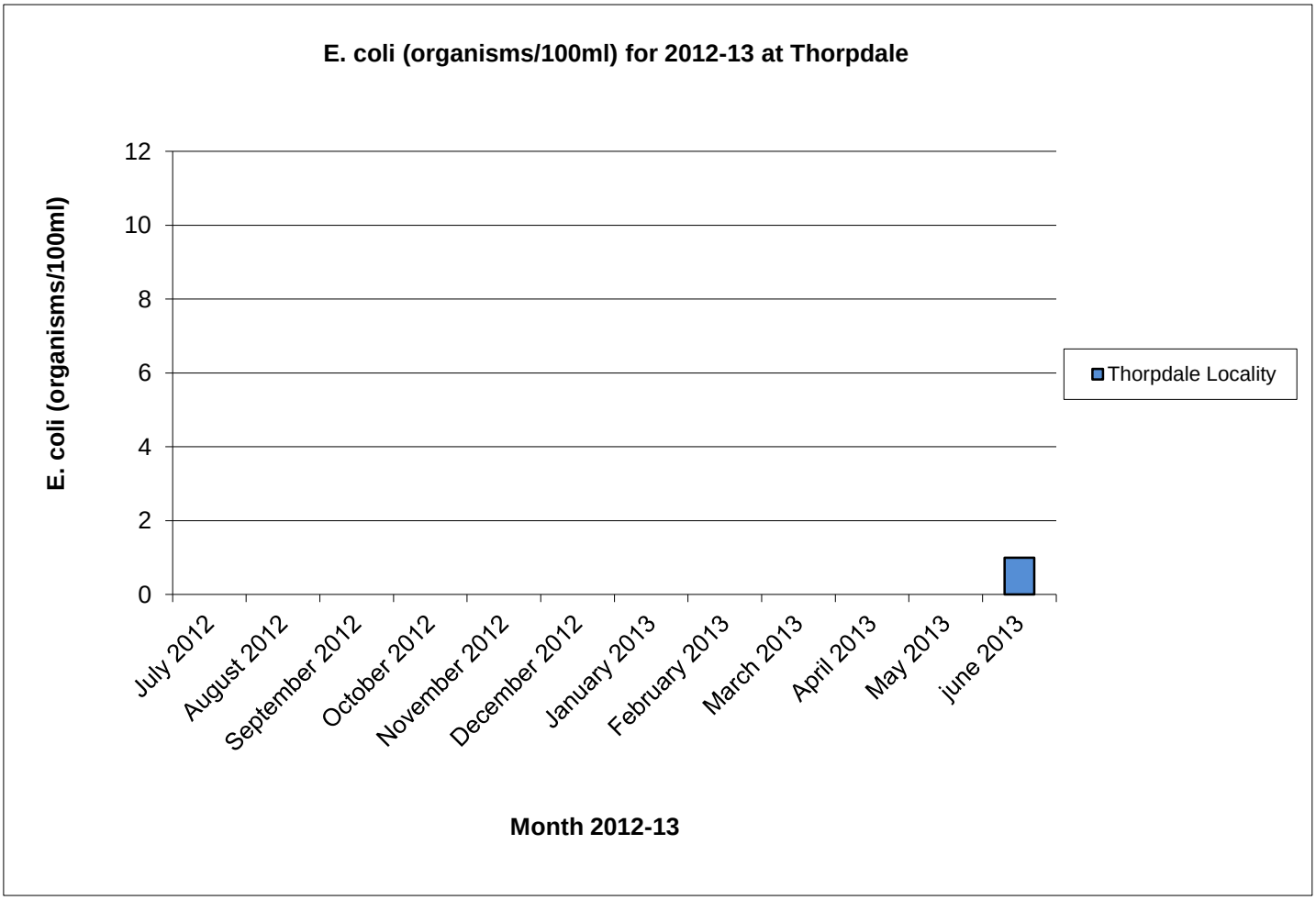
In June 2013 an *E. coli* detection was recorded in the Thorpdale sampling locality, with a result of 1 organisms /100mL in sample reported which is reportable under Section 22 of the *Safe Drinking Water Act 2003*. The sample was located at a customer tap.

Compliance with the SDWR for *E. coli* results was achieved in the Thorpdale sampling area even though positive results were recorded. The SDWR (2005) require at least 98% of all samples collected in any 12 month period to contain no *E. coli*. The percentage compliance for the Thorpdale sampling area for the 2012-13 reporting period was 98.1%. As per the reporting guidelines, only the customer tap non-compliance sample is taken into statistical consideration. .

Gippsland Water investigated the positive results and identified the cause was either sample contamination at the point of collection at the time of sampling, either due to contamination of the sample bottle or inadequate disinfection of the sampling equipment. Additional sampling training was provided to the water quality samplers and the techniques audited against established procedures for compliance. Additional samples were collected within the reticulation immediately after the positive results were reported. None of the repeat samples indicated the presence of *E. coli*.

The figure below gives a 12-month trend for Thorpdale township supplied with treated water from the Thorpdale water treatment plant.

Figure 5: *E. coli* (organisms/100ml) for 2012-13 for Thorpdale



During the third week of October 2012, an error occurred where a water quality sample for *E. coli* and turbidity was missed within the locality of Trafalgar. The sample was incorrectly sampled at an operational site, rather than a registered water quality site.

For this particular week, two samples sites were randomly selected by our Laboratory Services provider from a list of available Gippsland Water Sites. The sites selected and sampled were as follows:

- GIP-2774 - Trafalgar Water Entry Point Centenary Drive PRV (51 Contingent Street Trafalgar)
- GIP-5206 - Kenny's Road Disinfection site

The Trafalgar Water Entry Point site is an operational site and designates where water enters the Trafalgar locality. The Kenny's Road Disinfection Site was a recently created site, again for operational purposes to monitor water quality immediately upstream of the Trafalgar Water Entry Point. Unfortunately when the Kenny's Road Disinfection Site was registered, an error occurred whereby it was designated as a regulatory reticulation site, rather than an operation drinking water site.

As a result of this error, it was added to the list of sampling sites available to be selected at random for regulatory monitoring. By the time this error was detected, it was too late to take corrective action to ensure a sample was collected within this week. Therefore, there was technically no sample collected from within the Trafalgar locality from the registered regulatory sample sites, as required by legislation. However, the department was notified of this error, and the results from the above two sites that were sampled did not indicate any water quality issues.

An extra sample was scheduled to be taken from within the Trafalgar locality during week 4 of November 2012 to ensure the total yearly sample requirements were met.

8.2 CHLORINE BASED DISINFECTION BY-PRODUCT CHEMICALS

8.2.1 Chloroacetic acid results

For compliance with the SDWR, a sample result must not exceed 0.15 mg/L for chloroacetic acid. All Gippsland Water sites achieved 100% compliance with this standard for the 2012-13 reporting period.

Table 4: Chloroacetic acid results for all localities 2012-13

Locality	Frequency of sampling	No. of samples	No of non complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0	<0.005	<0.005	Yes
Boolarra	Monthly	12	0	<0.005	<0.005	Yes
Briagolong	Monthly	12	0	<0.005	<0.005	Yes
Churchill	Monthly	12	0	<0.005	<0.005	Yes
Coongulla-Glenmaggie	Monthly	12	0	<0.005	<0.005	Yes
Cowwarr	Monthly	12	0	<0.005	<0.005	Yes
Drouin	Monthly	12	0	<0.005	<0.005	Yes
Erica	Monthly	12	0	<0.005	<0.005	Yes
Heyfield	Monthly	12	0	<0.005	<0.005	Yes
Jumbuk	Monthly	12	0	<0.005	<0.005	Yes
Maffra	Monthly	12	0	<0.005	<0.005	Yes
Mirboo North	Monthly	12	0	<0.005	<0.005	Yes
Moe	Monthly	12	0	<0.005	<0.005	Yes
Morwell	Monthly	12	0	<0.005	<0.005	Yes
Neerim South	Monthly	12	0	<0.005	<0.005	Yes
Newborough	Monthly	12	0	<0.005	<0.005	Yes
Noojee	Monthly	12	0	<0.005	<0.005	Yes
Rawson	Monthly	12	0	<0.005	<0.005	Yes
Rokeby-Buln Buln	Monthly	12	0	<0.005	<0.005	Yes
Rosedale	Monthly	12	0	<0.005	<0.005	Yes
Sale-Wurruk	Monthly	12	0	<0.005	<0.005	Yes
Seaspray	Monthly	12	0	<0.005	<0.005	Yes
Stratford	Monthly	12	0	<0.005	<0.005	Yes
Thorpdale	Monthly	12	0	<0.005	<0.005	Yes
Toongabbie	Monthly	12	0	<0.005	<0.005	Yes
Trafalgar	Monthly	12	0	<0.005	<0.005	Yes
Traralgon	Monthly	12	0	<0.005	<0.005	Yes
Traralgon South-Hazelwood North	Monthly	12	0	<0.005	<0.005	Yes
Tyers-Glengarry	Monthly	12	0	<0.005	<0.005	Yes
Warragul	Monthly	12	0	<0.005	<0.005	Yes
Warragul South	Monthly	12	0	<0.005	<0.005	Yes
Willow Grove	Monthly	12	0	<0.005	<0.005	Yes
Yallourn North	Monthly	12	0	<0.005	<0.005	Yes
Yarragon	Monthly	12	0	<0.005	<0.005	Yes
Yinnar	Monthly	12	0	<0.005	<0.005	Yes

8.2.1.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

8.2.2 Dichloroacetic acid results

For compliance with the SDWR, a sample result must not exceed 0.1 mg/L dichloroacetic acid. All Gippsland Water sites achieved 100% compliance with this standard for the 2012-13 reporting period.

Table 5: Dichloroacetic acid results for all localities 2012-13

Locality	Frequency of sampling	No. of samples	No of non complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0	0.014	0.006	Yes
Boolarra	Monthly	12	0	0.010	<0.005	Yes
Briagolong	Monthly	12	0	<0.005	<0.005	Yes
Churchill	Monthly	12	0	0.010	<0.005	Yes
Coongulla-Glenmaggie	Monthly	12	0	0.008	<0.005	Yes
Cowwarr	Monthly	12	0	0.011	<0.005	Yes
Drouin	Monthly	12	0	0.016	0.007	Yes
Erica	Monthly	12	0	0.010	<0.005	Yes
Heyfield	Monthly	12	0	0.005	<0.005	Yes
Jumbuk	Monthly	12	0	0.008	<0.005	Yes
Maffra	Monthly	12	0	0.007	<0.005	Yes
Mirboo North	Monthly	12	0	<0.005	<0.005	Yes
Moe	Monthly	12	0	0.010	<0.005	Yes
Morwell	Monthly	12	0	0.008	<0.005	Yes
Neerim South	Monthly	12	0	0.010	<0.005	Yes
Newborough	Monthly	12	0	0.006	<0.005	Yes
Noojee	Monthly	12	0	0.009	<0.005	Yes
Rawson	Monthly	12	0	0.016	0.006	Yes
Rokeby-Buln Buln	Monthly	12	0	0.011	<0.005	Yes
Rosedale	Monthly	12	0	0.008	<0.005	Yes
Sale-Wurruk	Monthly	12	0	<0.005	<0.005	Yes
Seaspray	Monthly	12	0	0.009	<0.005	Yes
Stratford	Monthly	12	0	0.010	<0.005	Yes
Thorpdale	Monthly	12	0	0.012	<0.005	Yes
Toongabbie	Monthly	12	0	0.012	<0.005	Yes
Trafalgar	Monthly	12	0	0.009	<0.005	Yes
Traralgon	Monthly	12	0	0.009	<0.005	Yes
Traralgon South-Hazelwood North	Monthly	12	0	0.005	<0.005	Yes
Tyers-Glengarry	Monthly	12	0	0.014	<0.005	Yes
Warragul	Monthly	12	0	0.010	<0.005	Yes
Warragul South	Monthly	12	0	<0.005	<0.005	Yes
Willow Grove	Monthly	12	0	<0.005	<0.005	Yes
Yallourn North	Monthly	12	0	0.007	<0.005	Yes
Yarragon	Monthly	12	0	0.011	<0.005	Yes
Yinnar	Monthly	12	0	0.006	<0.005	Yes

8.2.2.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

8.2.3 Trichloroacetic acid results

For compliance with the SDWR, a sample result must not exceed 0.1 mg/L trichloroacetic acid. All Gippsland Water sites achieved 100% compliance with this standard for the 2012-13 reporting period.

Table 6: Trichloroacetic acid for all localities 2012-13

Locality	Frequency of sampling	No. of samples	No of non complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0	0.020	0.009	Yes
Boolarra	Monthly	12	0	0.035	0.006	Yes
Briagolong	Monthly	12	0	<0.005	<0.005	Yes
Churchill	Monthly	12	0	0.027	0.008	Yes
Coongulla-Glenmaggie	Monthly	12	0	0.012	<0.005	Yes
Cowwarr	Monthly	12	0	0.024	0.011	Yes
Drouin	Monthly	12	0	0.021	0.009	Yes
Erica	Monthly	12	0	0.013	<0.005	Yes
Heyfield	Monthly	12	0	0.007	<0.005	Yes
Jumbuk	Monthly	12	0	0.039	0.011	Yes
Maffra	Monthly	12	0	0.011	<0.005	Yes
Mirboo North	Monthly	12	0	<0.005	<0.005	Yes
Moe	Monthly	12	0	0.008	<0.005	Yes
Morwell	Monthly	12	0	0.018	0.006	Yes
Neerim South	Monthly	12	0	0.009	<0.005	Yes
Newborough	Monthly	12	0	0.013	<0.005	Yes
Noojee	Monthly	12	0	0.007	<0.005	Yes
Rawson	Monthly	12	0	0.020	0.006	Yes
Rokeby-Buln Buln	Monthly	12	0	0.019	0.007	Yes
Rosedale	Monthly	12	0	0.030	0.012	Yes
Sale-Wurruk	Monthly	12	0	<0.005	<0.005	Yes
Seaspray	Monthly	12	0	0.010	<0.005	Yes
Stratford	Monthly	12	0	0.015	<0.005	Yes
Thorpdale	Monthly	12	0	0.007	<0.005	Yes
Toongabbie	Monthly	12	0	0.024	0.012	Yes
Trafalgar	Monthly	12	0	0.009	<0.005	Yes
Traralgon	Monthly	12	0	0.014	<0.005	Yes
Traralgon South-Hazelwood North	Monthly	12	0	0.025	0.009	Yes
Tyers-Glengarry	Monthly	12	0	0.018	0.008	Yes
Warragul	Monthly	12	0	0.017	0.005	Yes
Warragul South	Monthly	12	0	0.017	0.010	Yes
Willow Grove	Monthly	12	0	<0.005	<0.005	Yes
Yallourn North	Monthly	12	0	0.013	<0.005	Yes
Yarragon	Monthly	12	0	0.010	<0.005	Yes
Yinnar	Monthly	12	0	0.033	0.007	Yes

8.2.3.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

8.2.4 Trihalomethanes (THM) results

For compliance with the SDWR, a sample result must not exceed 0.25 mg/L trihalomethanes. All Gippsland Water sites achieved 100% compliance with this standard for the 2012-13 reporting period.

Table 7: Trihalomethanes results for all localities for 2012-13

Locality	Frequency of sampling	No. of samples	No of non complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0	0.052	0.032	Yes
Boolarra	Monthly	12	0	0.087	0.055	Yes
Briagolong	Monthly	12	0	0.009	0.004	Yes
Churchill	Monthly	12	0	0.099	0.035	Yes
Coongulla-Glenmaggie	Monthly	12	0	0.049	0.014	Yes
Cowwarr	Monthly	12	0	0.069	0.045	Yes
Drouin	Monthly	12	0	0.083	0.031	Yes
Erica	Monthly	12	0	0.041	0.017	Yes
Heyfield	Monthly	12	0	0.031	0.017	Yes
Jumbuk	Monthly	12	0	0.088	0.058	Yes
Maffra	Monthly	12	0	0.038	0.016	Yes
Mirboo North	Monthly	12	0	0.053	0.015	Yes
Moe	Monthly	12	0	0.059	0.030	Yes
Morwell	Monthly	12	0	0.064	0.019	Yes
Neerim South	Monthly	12	0	0.042	0.027	Yes
Newborough	Monthly	12	0	0.064	0.034	Yes
Noojee	Monthly	12	0	0.029	0.020	Yes
Rawson	Monthly	12	0	0.040	0.016	Yes
Rokeby-Buln Buln	Monthly	12	0	0.080	0.029	Yes
Rosedale	Monthly	12	0	0.13	0.054	Yes
Sale-Wurruk	Monthly	12	0	0.030	0.017	Yes
Seaspray	Monthly	12	0	0.17	0.081	Yes
Stratford	Monthly	12	0	0.20	0.026	Yes
Thorpdale	Monthly	12	0	0.086	0.027	Yes
Toongabbie	Monthly	12	0	0.068	0.044	Yes
Trafalgar	Monthly	12	0	0.046	0.020	Yes
Traralgon	Monthly	12	0	0.025	0.008	Yes
Traralgon South-Hazelwood North	Monthly	12	0	0.061	0.035	Yes
Tyers-Glengarry	Monthly	12	0	0.055	0.036	Yes
Warragul	Monthly	12	0	0.069	0.026	Yes
Warragul South	Monthly	12	0	0.087	0.038	Yes
Willow Grove	Monthly	12	0	0.003	<0.001	Yes
Yallourn North	Monthly	12	0	0.064	0.047	Yes
Yarragon	Monthly	12	0	0.064	0.031	Yes
Yinnar	Monthly	12	0	0.080	0.030	Yes

8.2.4.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

8.3 OZONE BASED DISINFECTION BY-PRODUCT CHEMICALS

Gippsland Water has no ozone dosing systems and therefore the ozone based chemical concentrations of bromate and formaldehyde have not been included in the routine testing program.

8.4 ALUMINIUM

8.4.1 Aluminium results

For compliance with the SDWR, a sample result must not exceed a maximum of 0.2mg/L aluminium (acid soluble) in drinking water. Gippsland Water recorded one result of 0.22 mg/L for Willow Grove during the 2012-13 reporting period. With rounding to the nearest significant figure, this result is considered compliant with the requirements of the SDWR (ie. Less than 0.25 mg/L)

Table 8: Aluminium results for all localities in 2012-13

Locality	Frequency of Sampling	No. of Samples	No of non complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0	0.01	<0.01	Yes
Boolarra	Monthly	12	0	0.04	0.02	Yes
Briagolong	Monthly	12	0	0.02	<0.01	Yes
Churchill	Monthly	12	0	0.04	0.01	Yes
Coongulla & Glenmaggie	Monthly	12	0	0.08	<0.01	Yes
Cowwarr	Monthly	12	0	0.03	<0.01	Yes
Drouin	Monthly	12	0	0.13	0.02	Yes
Erica	Monthly	12	0	0.04	<0.01	Yes
Heyfield	Monthly	12	0	<0.01	<0.01	Yes
Jumbuk	Monthly	12	0	0.03	0.01	Yes
Maffra	Monthly	12	0	0.01	<0.01	Yes
Mirboo North	Monthly	12	0	<0.01	<0.01	Yes
Moe	Monthly	12	0	0.04	0.01	Yes
Morwell	Monthly	12	0	0.06	<0.01	Yes
Neerim South	Monthly	12	0	<0.01	<0.01	Yes
Newborough	Monthly	12	0	0.03	0.01	Yes
Noojee	Monthly	12	0	<0.01	<0.01	Yes
Rawson	Monthly	12	0	0.43	<0.01	**No**
Rokeby & Buln Buln	Monthly	12	0	0.14	0.02	Yes
Rosedale	Monthly	12	0	0.03	0.01	Yes
Sale/Wurruk	Monthly	12	0	0.01	<0.01	Yes
Seaspray	Monthly	12	0	0.03	<0.01	Yes
Stratford	Monthly	12	0	<0.01	<0.01	Yes
Thorpdale	Monthly	12	0	0.05	<0.01	Yes
Toongabbie	Monthly	12	0	0.03	<0.01	Yes
Trafalgar	Monthly	12	0	0.04	0.01	Yes
Traralgon	Monthly	12	0	0.05	0.01	Yes
Traralgon South & Hazelwood North	Monthly	12	0	0.04	0.01	Yes
Tyers & Glengarry	Monthly	12	0	0.04	<0.01	Yes
Warragul	Monthly	12	0	0.12	0.02	Yes
Warragul South	Monthly	12	0	0.09	0.04	Yes
Willow Grove	Monthly	12	0	0.22	<0.01	Yes
Yallourn North	Monthly	12	0	0.04	<0.01	Yes
Yarragon	Monthly	12	0	0.04	0.01	Yes
Yinnar	Monthly	12	0	0.04	0.01	Yes

8.4.1.1 Actions taken in relation to non-compliance

During the 2012-13 reporting period, one locality recorded an elevated Aluminium (Acid Soluble) level on one occasion.

In December 2012 an acid soluble aluminium non-compliance results was recorded in the Rawson sampling locality, with a result of 0.32mg/L in sample reported which is above the limit of 0.25mg/L.

Gippsland Water investigated the exceedance and could not identify an exact cause since due to the occasional historical exceedance the aluminium based chemical coagulant previously used was replaced with an iron based chemical coagulant in 2010.

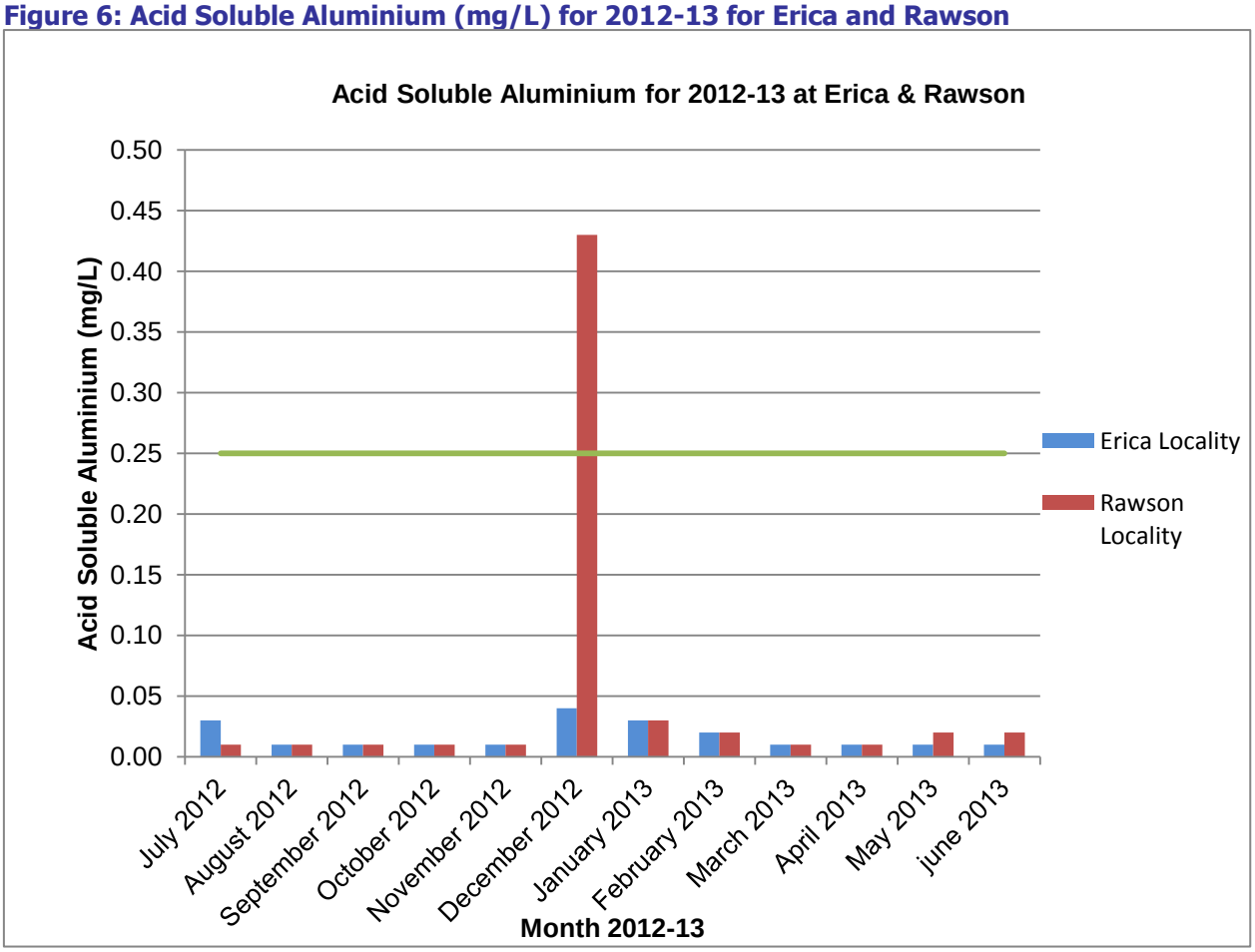
The cause of the non-compliance is unknown, but a build up of accumulated material possibly occurred on the upstream side of the pressure reducing valve (PRV) where the sample point is located.

The area upstream and downstream of the PRV was flushed. Samples were taken across the reticulation at Rawson and Erica to verify water quality compliance.

As the sample point is not representative of the reticulation water quality and not located at a customer tap, the sample site has been removed from the list of available sites.

Refer to Section 5.2 where this incident was reported under SDWA Section 18 to DoH.

Figure 6: Acid Soluble Aluminium (mg/L) for 2012-13 for Erica and Rawson



Note that the data point in December 2012 for the Erica locality is 0.04 mg/L and is compliant with the requirements of the SDWA.

8.5 TURBIDITY

8.5.1 Turbidity results

For compliance with the SDWR, the 95% upper confidence limit of the mean of all values for samples of drinking water collected in any 12-month period, must have turbidity measured as less than or equal to 5.0 NTU (Nephelometric Turbidity Unit). All Gippsland Water sites achieved 100% compliance with this standard for the 2012-13 reporting period.

Table 9: Turbidity results for all localities in 2012-13

Locality	Frequency of Sampling	No. of Samples	No of non complying samples	Max (NTU)	Min (NTU)	95% UCL of mean*	Complying (Yes/No)
Boisdale	Weekly	52	0	0.7	<0.1	0.2	Yes
Boolarra	Weekly	52	0	0.8	<0.1	0.2	Yes
Briagolong	Weekly	52	0	0.2	<0.1	0.1	Yes
Churchill	Weekly	52	0	0.2	<0.1	0.1	Yes
Coongulla & Glenmaggie	Weekly	52	0	1.7	<0.1	0.3	Yes
Cowwarr	Weekly	52	0	1.2	<0.1	0.2	Yes
Drouin	Weekly	52	0	0.2	<0.1	0.1	Yes
Erica	Weekly	52	0	4.6	<0.1	0.6	Yes
Heyfield	Weekly	52	0	0.1	<0.1	0.1	Yes
Jumbuk	Weekly	52	0	0.2	<0.1	0.1	Yes
Maffra	Weekly	52	0	0.6	<0.1	0.2	Yes
Mirboo North	Weekly	52	0	0.1	<0.1	0.1	Yes
Moe	Weekly	52	0	0.3	<0.1	0.1	Yes
Morwell	Weekly	52	0	0.5	<0.1	0.1	Yes
Neerim South	Weekly	52	0	0.6	<0.1	0.2	Yes
Newborough	Weekly	52	0	0.1	<0.1	0.1	Yes
Noojee	Weekly	52	0	0.3	0.1	0.2	Yes
Rawson	Weekly	52	0	1.4	<0.1	0.2	Yes
Rokeby & Buln Buln	Weekly	52	0	0.4	<0.1	0.1	Yes
Rosedale	Weekly	52	0	0.3	<0.1	0.1	Yes
Sale/Wurruk	Weekly	52	0	1.2	<0.1	0.3	Yes
Seaspray	Weekly	52	0	1.1	0.1	0.4	Yes
Stratford	Weekly	52	0	0.3	<0.1	0.1	Yes
Thorpdale	Weekly	52	0	1.1	0.2	0.4	Yes
Toongabbie	Weekly	52	0	0.3	<0.1	0.1	Yes
Trafalgar	Weekly	51	0	0.3	<0.1	0.1	Yes
Traralgon	Weekly	52	0	0.7	<0.1	0.2	Yes
Traralgon South & Hazelwood North	Weekly	52	0	0.2	<0.1	0.1	Yes
Tyers & Glengarry	Weekly	52	0	1.0	<0.1	0.2	Yes
Warragul	Weekly	52	0	0.3	<0.1	0.1	Yes
Warragul South	Weekly	52	0	0.3	<0.1	0.2	Yes
Willow Grove	Weekly	52	0	0.3	<0.1	0.1	Yes
Yallourn North	Weekly	52	0	0.3	<0.1	0.1	Yes
Yarragon	Weekly	52	0	0.3	<0.1	0.1	Yes
Yinnar	Weekly	52	0	0.4	<0.1	0.2	Yes

*In order to calculate the mean, standard deviation and confidence levels results <0.1NTU were rounded up to 0.1NTU

8.5.1.1 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

For the reporting period,51 samples were collected from the Trafalgar reticulation due to a sample being missed. Please refer to comments under Section 8.1.2.

8.6 FLUORIDE

Fluoride testing has been performed in the water supply systems where fluoride is artificially added to the water (supplies of Maffra, Warragul, Sale Traralgon, Morwell and Moe).

Gippsland Water has sampled localities on a weekly basis even though some of the localities listed in table 11 require monthly samples according to section 5.1.4 of the Code of Practice for Fluoridation of Drinking Water Supplies (i.e. if a fluoride plant supplies five or more water sampling localities then the authority must take a sample each month from a water sampling point in each water sampling locality supplied from those plant such that a sample is collected from the distribution system at least once per week).

8.6.1 Fluoride results

Based on health considerations, no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average level of fluoride should not exceed 1.0 mg/L. All Gippsland Water sites achieved 100% compliance with this standard for the 2012-13 reporting period.

Table 10: Fluoride results for all fluoridated localities in 2012-13

Treatment Plant	Locality	Required Frequency of Sampling	Actual No. of Samples	Operating Target	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)	Operating Average[2] (mg/L)	Comply[3] (Yes /No)	Meeting Obligations[4] (Yes/No)
Maffra	Boisdale	Weekly	52	0.9	0.66	0.40	0.54	0.54	Yes	No
	Maffra	Weekly	52	0.9	0.66	0.09	0.52	0.53	Yes	No
	Stratford	Weekly	52	0.9	0.69	0.38	0.52	0.52	Yes	No
Morwell	Churchill	Monthly	52	0.9	0.83	<0.05	0.54	0.70	Yes	Yes
	Boolarra	Monthly	52	0.9	0.76	<0.05	0.52	0.67	Yes	Yes
	Jumbuk	Monthly	52	0.9	0.79	0.07	0.57	0.69	Yes	Yes
	Morwell	Monthly	52	0.9	0.87	<0.05	0.52	0.71	Yes	Yes
	Traralgon South/ Hazelwood North	Monthly	52	0.9	0.83	<0.05	0.55	0.70	Yes	Yes
	Yinnar	Monthly	52	0.9	0.79	<0.05	0.56	0.70	Yes	Yes
Moe	Moe	Monthly	52	0.9	0.85	<0.05	0.67	0.75	Yes	Yes
	Newborough	Monthly	52	0.9	0.85	<0.05	0.68	0.75	Yes	Yes
	Trafalgar	Monthly	52	0.9	0.86	<0.05	0.64	0.76	Yes	Yes
	Yallourn North	Monthly	52	0.9	0.82	0.06	0.69	0.74	Yes	Yes
	Yarragon	Monthly	52	0.9	0.85	<0.05	0.66	0.74	Yes	Yes
Sale	Sale/Wurruk	Weekly	52	0.9	0.93	<0.05	0.76	0.85	Yes	Yes
Traralgon	Traralgon	Weekly	52	0.9	0.95	<0.05	0.38	0.72	Yes	Yes
Warragul	Drouin	Weekly	52	0.9	1.1	<0.05	0.79	0.89	Yes	Yes
	Rokeby/Buln Buln	Weekly	52	0.9	1.1	<0.05	0.76	0.89	Yes	Yes
	Warragul	Weekly	52	0.9	1.1	<0.05	0.78	0.89	Yes	Yes
	Warragul South	Weekly	52	0.9	1.0	0.15	0.73	0.91	Yes	Yes

1 = The average value calculated based on all monitoring conducted over the 2012-13 reporting period, including the when dosing did not occur.
2 = The average calculated excluding the times where dosing did not occur.
3 = Complying is defined as any sample not exceeding 1.5 mg/L, or the 12-month rolling average not exceeding 1.0 mg/L.
4 = Meeting Obligation is defined as the annual average concentration of fluoride was greater than 0.6 mg/L excluding when dosing did not occur

8.6.1.1 Actions taken in relation to non-compliance

Morwell, Moe, Sale, Traralgon and Warragul achieved 100% compliance with the compliance standard for the 2012-13 reporting period.

Maffra did not achieve an overall operating target of 0.6mg/L for the reporting period. This was due to the system being operated at a lower set point to minimize the risk of overdosing prior to significant upgrade works being conducted.

8.6.1.2 Localities which did not receive fluoridated water as a results of treatment plant issues and upgrades

The fluoride dosing system at the **Traralgon** water treatment plant was turned off within the reporting period for greater than 72 hours on the following occasions:

- between 1 June to 22 October 2012 - due to re-design of the Water Treatment Plant outlet manifold and installation of a new flow meter and fluoride dosing system.
- Between 9 February and 12 February 2013 - for system maintenance and cleaning;
- Between 25 February and 28 February 2013 - for system maintenance and cleaning.
- from the 6 May 2013 until the end of the reporting period (30 June 2013) due to issues with the supply of sodium fluoride from Gippsland Water's chemical supplier.

The fluoride dosing system at the **Maffra** water treatment plant was turned off within the reporting period for greater than 72 hours on the following occasion:

- between 12 and 17 October 2012, the Maffra system was shut down on 3 – 4 occasions to perform routine plant maintenance and improvements.

The fluoride dosing system at the **Warragul** water treatment plant was turned off within the reporting period for greater than 72 hours on the following occasions:

- between 3 April and 15 April 2013 – to undertake system cleaning and maintenance; ;
- from the 6 May 2013 until the end of the reporting period (30 June 2013) due to issues with the supply of sodium fluoride from Gippsland Water's chemical supplier.

The fluoride dosing system at the **Sale** water treatment plant was turned off within the reporting period for greater than 72 hours on the following occasion:

- from the 6 May 2013 until the end of the reporting period (30 June 2013) due to issues with the supply of sodium fluoride from Gippsland Water's chemical supplier.

The fluoride dosing system at the **Morwell** water treatment plant was turned off within the reporting period for greater than 72 hours on the following occasions:

- between 8 January to 29 January 2013 – for system maintenance and repairs;
- between 8 February to 28 March 2013 – for system and storage maintenance and building repairs;
- from the 6 May 2013 until the end of the reporting period (30 June 2013) due to issues with the supply of sodium fluoride from Gippsland Water's chemical supplier.

The fluoride dosing system at the **Moe** water treatment plant was turned off within the reporting period for greater than 72 hours on the following occasions:

- between 13 September to 21 September 2012 – installation of new tank and product handling system;
- between 1 January to 25 January 2013 – for system improvements;

- between 8 February to 13 February 2013 – awaiting deliver of sodium fluoride in new packaging;
- from the 17 June 2013 until the end of the reporting period (30 June 2013) due to issues with the supply of sodium fluoride from Gippsland Water's chemical supplier.

Sodium Fluoride is supplied in Polyvinyl Alcohol (PVA) dissolvable bags at 5 of the 6 fluoridated water supply systems. PVA monitoring was undertaken in the reticulation systems of the following localities quarterly (3 monthly) between July 2012 to June 2013, to assess any product carry over from the fluoridation process. All Gippsland Water sites tested achieved compliance with the guideline limits for the 2012-13 reporting period.

Table 11: Polyvinyl Alcohol results for fluoridated systems in 2012-13

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)*
Moe	Monthly	4	<0.05
Morwell	Monthly	4	<0.05
Sale	Monthly	4	<0.05
Traralgon	Monthly	4	<0.05
Warragul	Monthly	4	<0.05

*Results of <0.05 mg/L are at the detection limit for this parameter.

8.7 WATER TREATMENT PROJECTS & PROGRAMS UNDERTAKEN

During the 2012-13 reporting period Gippsland Water undertook a number of works, programs or projects to ensure that continual improvements were made to ensure the ongoing provision of safe drinking water to its customers. These included:

- Interconnection of Boolarra to Morwell supply system
- Ongoing water treatment plant filter upgrades and refurbishment program
- Install activated carbon at Seaspray WTP to reduce THM levels
- Install permanent activated carbon system at Coongulla WTP to manage taste and odour
- Ongoing treated water basin storage inspection and cleaning program
- Installation and upgrades of remote disinfection sites including installation of new site in Boolarra water supply locality
- Ongoing implementation of water reticulation mains air scouring program
- Commissioning of Seaspray raw water basing for Bulk Entitlement compliance security of supply purposes

Figure 7:-Coongulla Water Supply Locality Project

Water treatment plant granular activated carbon (GAC) system installation for water quality taste and odour management.

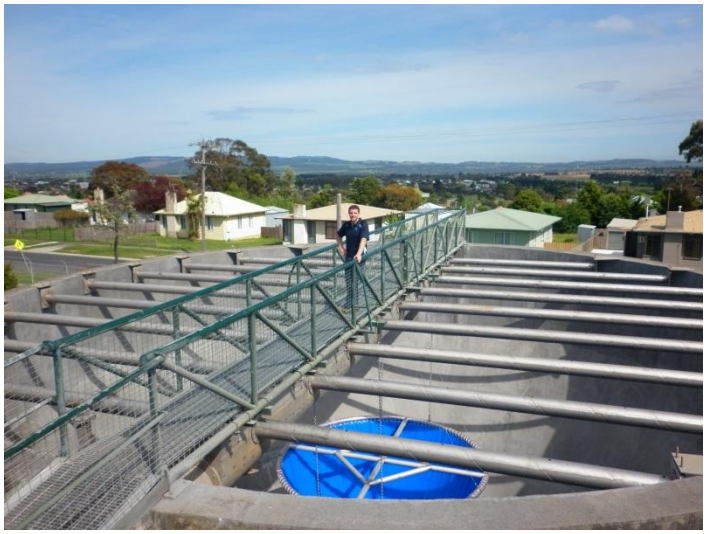


Figure 8:–Morwell Water Supply Locality Project

Water treatment plant clarifier refurbishment and upgrade to extend asset operational life .

Figure 9:–Neerim South Water Supply Locality Project

Water treatment plant installation of portable dissolved air flotation filtration (DAFF) treatment cell to enable the water treatment filter refurbishment to be undertaken to extend the filter asset operational life.

Figure 10:–Seaspray Water Supply Locality Project

Water treatment plant installation of sludge handling and supernatant return system.

The following improvements were achieved over the course of Water Plan 2 (2008 – 2013):

- Refurbishment of filter #3 at Traralgon Water Treatment Plant
-

8.8 OTHER ALGAE, PATHOGEN, CHEMICAL OR SUBSTANCE NOT SPECIFIED THAT MAY POSE A RISK TO HUMAN HEALTH

8.8.1 Overall results

During the reporting period, the corporation monitored for the following health-related aspects of the drinking water supplied to customer taps. Table 13 lists the parameters and the frequency of samples taken across all localities, comparing the results to the ADWG and the health-based guidelinevalue.

Table 12: Other sampled parameter results for all localities in 2012-13

Parameter	Frequency of sampling	No. samples	Results According to ADWG values		
			Guideline value	Result	Locality
Nitrite	Weekly (3 Localities)	162	≤ 3 mg/L	All results below ADWG health guideline values	
Mercury	Quarterly	140	≤ 0.001 mg/L		
Chromium	Quarterly	140	≤ 0.05 mg/L		
Cadmium	Quarterly	140	≤ 0.002 mg/L		
Nitrate	Quarterly	140	≤ 50 mg/L		
Nickel	Annually	35	≤ 0.02 mg/L		

Monitoring for other parameters such as radiological, pesticides, protozoan organisms is conducted routinely. A complete list of raw water parameters monitored is contained in Appendix 1. Additional monitoring is performed on a risk basis and as the need arises.

The following table contains Blue Green Algae (BGA) monitoring undertaken across Gippsland Water storages based on visual and water quality triggers. Major raw water supply/storages are routinely monitored for BGA as part of the routine catchment monitoring program.

Table 13: Routine BGA monitoring for raw water supplies in 2012-13

Location	Jul '12	Aug '12	Sept '12	Oct '12	Nov '12	Dec '12	Jan '13	Feb '13	Mar '13	Apr '13	May '13	Jun '13
Maffra Weir					1			1				
Heyfield Raw Water Storage	1	1	1	1	1	1	1	1	1	1	1	1
Boolarra Raw Water Storage					1			1				
Thorpdale Raw Water Storage				1	1	1	1	1				
Neerim South Tarago Reservoir				1	1	1	1	1	1			
Rawson Amours Basin				1				1				
Blue Rock Lake	***As required (Southern Rural Water BGA Program)***											
Lake Glenmaggie	***As required (Southern Rural Water BGA Program)***											
Tarago Reservoir	***As required (Melbourne Water BGA Program)***											
Moondarra Surface	1	1	1	1	1	1	1	1	1	1	1	1
Moondarra Pipe line	1	1	1	1						1	1	1
Moondarra Upper reaches	***As required***											

8.8.2 Manganese

Manganese can be naturally present in either soluble or insoluble forms in water. When concentrations exceed the aesthetic guideline of 0.1 mg/L, manganese can create unacceptable tastes in water, as well as stain fixtures and laundry. Compliance is measured against the health guideline value of 0.5 mg/L in ADWG. Gippsland Water sites achieved 100% compliance against manganese guideline values.

Table 14: Manganese results for all localities in 2012-13

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0.006	<0.001	Yes
Boolarra	Monthly	12	0.007	<0.001	Yes
Briagolong	Monthly	12	0.001	<0.001	Yes
Churchill	Monthly	12	<0.001	<0.001	Yes
Coongulla & Glenmaggie	Monthly	12	0.023	<0.001	Yes
Cowwarr	Monthly	12	0.007	<0.001	Yes
Drouin	Monthly	12	0.003	<0.001	Yes
Erica	Monthly	12	0.019	0.002	Yes
Heyfield	Monthly	12	0.006	0.002	Yes
Jumbuk	Monthly	12	<0.001	<0.001	Yes
Maffra	Monthly	12	0.003	<0.001	Yes
Mirboo North	Monthly	12	<0.001	<0.001	Yes
Moe	Monthly	12	0.010	0.001	Yes
Morwell	Monthly	12	0.003	<0.001	Yes
Neerim South	Monthly	12	0.028	0.001	Yes
Newborough	Monthly	12	0.003	<0.001	Yes
Noojee	Monthly	12	0.007	0.002	Yes
Rawson	Monthly	12	0.037	0.002	Yes
Rokeby & Buln Buln	Monthly	12	0.002	<0.001	Yes
Rosedale	Monthly	12	0.005	<0.001	Yes
Sale/Wurruk	Monthly	12	0.001	<0.001	Yes
Seaspray	Monthly	12	0.011	0.005	Yes
Stratford	Monthly	12	0.002	<0.001	Yes
Thorpdale	Monthly	12	0.041	0.002	Yes
Toongabbie	Monthly	12	0.007	<0.001	Yes
Trafalgar	Monthly	12	0.005	<0.001	Yes
Traralgon	Monthly	12	0.005	<0.001	Yes
Traralgon South & Hazelwood North	Monthly	12	<0.001	<0.001	Yes
Tyers & Glengarry	Monthly	12	0.006	<0.001	Yes
Warragul	Monthly	12	0.005	<0.001	Yes
Warragul South	Monthly	12	0.001	<0.001	Yes
Willow Grove	Monthly	12	0.005	0.001	Yes
Yallourn North	Monthly	12	0.003	<0.001	Yes
Yarragon	Monthly	12	0.010	<0.001	Yes
Yinnar	Monthly	12	<0.001	<0.001	Yes

8.8.3 Lead

Lead can be present in drinking water as a result of dissolution from natural sources or from household plumbing. Based on heath considerations in the ADWG, concentrations of lead in drinking water should not exceed 0.01 mg/L. Gippsland Water sites achieved 100% compliance against lead guideline values.

Table 15: Lead results for all localities in 2012-13

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Quarterly	4	<0.001	<0.001	Yes
Boolarra	Quarterly	4	<0.001	<0.001	Yes
Briagolong	Quarterly	4	<0.001	<0.001	Yes
Churchill	Quarterly	4	<0.001	<0.001	Yes
Coongulla & Glenmaggie	Quarterly	4	<0.001	<0.001	Yes
Cowwarr	Quarterly	4	<0.001	<0.001	Yes
Drouin	Quarterly	4	<0.001	<0.001	Yes
Erica	Quarterly	4	0.001	<0.001	Yes
Heyfield	Quarterly	4	<0.001	<0.001	Yes
Jumbuk	Quarterly	4	<0.001	<0.001	Yes
Maffra	Quarterly	4	<0.001	<0.001	Yes
Mirboo North	Quarterly	4	<0.001	<0.001	Yes
Moe	Quarterly	4	<0.001	<0.001	Yes
Morwell	Quarterly	4	<0.001	<0.001	Yes
Neerim South	Quarterly	4	<0.001	<0.001	Yes
Newborough	Quarterly	4	<0.001	<0.001	Yes
Noojee	Quarterly	4	<0.001	<0.001	Yes
Rawson	Quarterly	4	<0.001	<0.001	Yes
Rokeby & Buln Buln	Quarterly	4	<0.001	<0.001	Yes
Rosedale	Quarterly	4	<0.001	<0.001	Yes
Sale/Wurruk	Quarterly	4	0.001	<0.001	Yes
Seaspray	Quarterly	4	<0.001	<0.001	Yes
Stratford	Quarterly	4	<0.001	<0.001	Yes
Thorpdale	Quarterly	4	<0.001	<0.001	Yes
Toongabbie	Quarterly	4	0.001	<0.001	Yes
Trafalgar	Quarterly	4	<0.001	<0.001	Yes
Traralgon	Quarterly	4	<0.001	<0.001	Yes
Traralgon South & Hazelwood North	Quarterly	4	<0.001	<0.001	Yes
Tyers & Glengarry	Quarterly	4	<0.001	<0.001	Yes
Warragul	Quarterly	4	<0.001	<0.001	Yes
Warragul South	Quarterly	4	<0.001	<0.001	Yes
Willow Grove	Quarterly	4	<0.001	<0.001	Yes
Yallourn North	Quarterly	4	<0.001	<0.001	Yes
Yarragon	Quarterly	4	<0.001	<0.001	Yes
Yinnar	Quarterly	4	<0.001	<0.001	Yes

8.8.4 Copper

Copper is present in raw water supplies at very low concentrations. Copper can be found in higher concentrations in drinking water as a result of corrosion of copper pipes and fittings. Based on heath considerations in the ADWG concentrations of copper in drinking water should not exceed 2 mg/L. The aesthetic guideline value is 1 mg/L. Gippsland Water sites achieved 100% compliance against both copper guideline values.

Table 16: Copper results for all localities in 2012-13

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Quarterly	4	0.008	0.006	Yes
Boolarra	Quarterly	4	0.003	0.002	Yes
Briagolong	Quarterly	4	0.016	0.002	Yes
Churchill	Quarterly	4	0.005	0.003	Yes
Coongulla & Glenmaggie	Quarterly	4	0.003	<0.001	Yes
Cowwarr	Quarterly	4	0.037	0.008	Yes
Drouin	Quarterly	4	0.025	<0.001	Yes
Erica	Quarterly	4	0.16	0.011	Yes
Heyfield	Quarterly	4	0.061	0.007	Yes
Jumbuk	Quarterly	4	0.008	0.002	Yes
Maffra	Quarterly	4	0.100	0.003	Yes
Mirboo North	Quarterly	4	0.011	0.004	Yes
Moe	Quarterly	4	0.005	0.003	Yes
Morwell	Quarterly	4	0.010	0.003	Yes
Neerim South	Quarterly	4	0.052	0.027	Yes
Newborough	Quarterly	4	0.009	0.002	Yes
Noojee	Quarterly	4	0.018	0.005	Yes
Rawson	Quarterly	4	0.048	0.003	Yes
Rokeby & Buln Buln	Quarterly	4	0.005	<0.001	Yes
Rosedale	Quarterly	4	0.015	0.002	Yes
Sale-Wurruk	Quarterly	4	<0.001	<0.001	Yes
Seaspray	Quarterly	4	0.005	0.003	Yes
Stratford	Quarterly	4	0.009	0.002	Yes
Thorpdale	Quarterly	4	0.010	<0.001	Yes
Toongabbie	Quarterly	4	0.043	0.014	Yes
Trafalgar	Quarterly	4	0.012	<0.001	Yes
Traralgon	Quarterly	4	0.003	<0.001	Yes
Traralgon South & Hazelwood North	Quarterly	4	0.007	<0.001	Yes
Tyers & Glengarry	Quarterly	4	0.027	0.007	Yes
Warragul	Quarterly	4	0.007	<0.001	Yes
Warragul South	Quarterly	4	0.014	<0.001	Yes
Willow Grove	Quarterly	4	0.030	<0.001	Yes
Yallourn North	Quarterly	4	0.006	0.002	Yes
Yarragon	Quarterly	4	0.028	<0.001	Yes
Yinnar	Quarterly	4	0.005	<0.001	Yes

8.9 AESTHETICS

8.9.1 pH results

In addition to the monitoring of parameters to determine compliance against the SDWA regulations, pH is routinely monitored in the reticulation system. The ADWG suggest that the drinking water be between pH 6.5 and pH 8.5. The pH results for all towns are provided below.

Table 17: pH results for all localities in 2012-13

Locality	Frequency of Sampling	No. of Samples	Max (units)	Min (units)	Average (units)
Boisdale	Weekly	52	8.0	7.3	7.6
Boolarra	Weekly	52	7.9	7.1	7.4
Briagolong	Weekly	52	7.4	6.8	7.2
Churchill	Weekly	52	8.0	7.0	7.4
Coongulla & Glenmaggie	Weekly	52	9.2	7.6	8.4
Cowwarr	Weekly	52	7.9	7.1	7.4
Drouin	Weekly	52	8.4	6.8	7.3
Erica	Weekly	52	8.7	6.5	7.4
Heyfield	Weekly	52	8.0	6.8	7.2
Jumbuk	Weekly	52	8.0	7.2	7.5
Maffra	Weekly	52	7.5	6.7	7.1
Mirboo North	Weekly	52	7.8	6.9	7.3
Moe	Weekly	52	8.2	6.8	7.4
Morwell	Weekly	52	9.1	6.9	7.3
Neerim South	Weekly	52	7.5	6.6	6.9
Newborough	Weekly	52	8.5	7.0	7.5
Noojee	Weekly	52	8.0	7.0	7.3
Rawson	Weekly	52	7.6	6.6	7.1
Rokeby & Buln Buln	Weekly	52	7.9	6.8	7.4
Rosedale	Weekly	52	8.7	7.3	8.0
Sale/Wurruk	Weekly	52	8.4	7.7	8.0
Seaspray	Weekly	52	8.8	7.2	7.7
Stratford	Weekly	52	7.6	6.9	7.2
Thorpdale	Weekly	52	8.2	6.9	7.4
Toongabbie	Weekly	52	7.6	7.0	7.3
Trafalgar	Weekly	52	7.7	6.9	8.2
Traralgon	Weekly	52	7.5	6.5	7.2
Traralgon South & Hazelwood North	Weekly	52	8.8	6.9	7.3
Tyers & Glengarry	Weekly	52	8.2	6.9	7.3
Warragul	Weekly	52	8.2	6.7	7.4
Warragul South	Weekly	52	8.9	7.0	7.7
Willow Grove	Weekly	52	7.6	6.6	7.1
Yallourn North	Weekly	52	8.6	7.0	7.4
Yarragon	Weekly	52	9.1	7.4	8.3
Yinnar	Weekly	52	7.8	7.0	7.3

Some systems have experienced elevated pH results, as a result of long residence of water in the reticulation, cement-lined pipes in parts of the reticulation and reduced flushing programs due to the permanent water saving rules in place. All average pH results were within the range of 6.5 to 8.5.

ADWG states that cement mortar lined pipes can significantly increase the pH and a value up to 9.2 may be tolerated provided monitoring indicates no deterioration in the microbiological quality.

8.9.2 Iron results

Iron can become apparent in taste in water at about 0.3 mg/L and above. High concentrations can give water a rust-brown appearance and cause staining of laundry and plumbing fittings. Based on aesthetic considerations the concentration in the ADWG, of iron in drinking water should not exceed 0.3 mg/L however no health-based guideline value has been set for iron.

Table 18: Iron results for all localities in 2012-13

Locality	Frequency of Sampling	No. of Samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0.03	<0.01	Yes
Boolarra	Monthly	12	0.07	0.03	Yes
Briagolong	Monthly	12	0.04	<0.01	Yes
Churchill	Monthly	12	0.04	<0.01	Yes
Coongulla & Glenmaggie	Monthly	12	0.05	<0.01	Yes
Cowwarr	Monthly	12	<0.01	<0.01	Yes
Drouin	Monthly	12	0.04	<0.01	Yes
Erica	Monthly	12	0.37	0.05	Yes
Heyfield	Monthly	12	0.03	<0.01	Yes
Jumbuk	Monthly	12	0.02	0.01	Yes
Maffra	Monthly	12	0.02	<0.01	Yes
Mirboo North	Monthly	12	0.03	<0.01	Yes
Moe	Monthly	12	0.06	<0.01	Yes
Morwell	Monthly	12	0.14	<0.01	Yes
Neerim South	Monthly	12	0.12	0.01	Yes
Newborough	Monthly	12	<0.01	<0.01	Yes
Noojee	Monthly	12	0.08	0.02	Yes
Rawson	Monthly	12	1.2	0.03	No
Rokeby & Buln Buln	Monthly	12	0.02	<0.01	Yes
Rosedale	Monthly	12	0.02	<0.01	Yes
Sale/Wurruk	Monthly	12	0.11	<0.01	Yes
Seaspray	Monthly	12	0.27	<0.01	Yes
Stratford	Monthly	12	0.02	<0.01	Yes
Thorpdale	Monthly	12	0.12	0.03	Yes
Toongabbie	Monthly	12	<0.01	<0.01	Yes
Trafalgar	Monthly	12	0.03	<0.01	Yes
Traralgon	Monthly	12	<0.01	<0.01	Yes
Traralgon South & Hazelwood North	Monthly	12	0.02	<0.01	Yes
Tyers & Glengarry	Monthly	12	0.01	<0.01	Yes
Warragul	Monthly	12	0.02	<0.01	Yes
Warragul South	Monthly	12	0.02	<0.01	Yes
Willow Grove	Monthly	12	0.04	<0.01	Yes
Yallourn North	Monthly	12	0.03	<0.01	Yes
Yarragon	Monthly	12	<0.01	<0.01	Yes
Yinnar	Monthly	12	0.11	<0.01	Yes

In December 2012 an iron result was recorded in the Rawson sampling locality, with a result of 1.2 mg/L reported which is above the aesthetic limit of 0.3mg/L.

The elevated iron result occurred on the same water quality sample as the elevated acid soluble aluminium result was reported.

Gippsland Water investigated the exceedance and identified that the source of the iron was most likely associated with iron based chemical coagulant that has been in use since 2010. The Rawson water treatment plant was operating within it operational set points and while the cause of the elevated result reported is

unknown, it is likely a build up of accumulated material had occurred on the upstream side of the pressure reducing valve (PRV) where the sample point is located.

The area upstream and downstream of the PRV was flushed. Samples were taken across the reticulation at Rawson and Erica to verify water quality compliance.

As the sample point is not representative of the reticulation water quality and not located at a customer tap, the sample site has been removed from the list of available sites.

8.10 ANALYSIS OF RESULTS

8.10.1 Comparison to previous years

The water quality standards required under the SDWR have been represented as trend data over the previous three financial years. This information allows for a comparison of data for the major towns.

An analysis by the percentage of water sampling localities where the drinking water complied with each of Schedule 2 of the SDWR parameters, over the past three reporting periods, is shown below. The table also shows an analysis of the percentage of customers supplied with drinking water that complied with the standards.

Table 19: Compliance by locality and population

	Percentage by Locality			Percentage by Population		
Parameter	**2010-2011**	**2011-2012**	**2012-13**	**2010-2011**	**2011-2012**	**2012-13**
Aluminium	100%	100%	97%	100%	100%	99.57%
Chloroacetic Acid	100%	100%	100%	100%	100%	100%
Dichloroacetic Acid	100%	100%	100%	100%	100%	100%
E. coli	100%	97%	100%	100%	99.74%	100%
Trichloroacetic Acid	100%	100%	100%	100%	100%	100%
Trihalomethanes	100%	100%	100%	100%	100%	100%
Turbidity	100%	100%	100%	100%	100%	100%

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9 UNDERTAKINGS UNDER SECTION 30 OF THE SDWA

Gippsland Water has no undertakings relevant to the 2012-13 reporting year.

10 EXEMPTIONS UNDER SECTION 20 OF THE SDWA

Gippsland Water has no exemptions relevant to the 2012-13 reporting year.

11 VARIATION IN AESTHETIC STANDARDS

Gippsland Water has no variations in aesthetic standards sought under section 19 of the SDWA.

12 REGULATED WATER

Gippsland Water does not manage any regulated water supplies.

13 GLOSSARY OF TERMS

ADWG	*Australian Drinking Water Guidelines 2011* prepared by National Health and Medical Research Council.
DH	Department of Health formerly known as DHS (Department of Human Services)
Detection limit	The lowest concentration of analytical parameter in the sample that can be detected by the process laboratory.
Drinking Water Supply systems	Towns supplied with water from a common water source (WTP, supply mains and reticulation pipe-work).
E. coli	*Escherichia coli*.
Locality	Under the SDWR, a specified area that is supplied with drinking water by a water supplier.
mg/L	Milligram per litre.
NTU	Nephelometric Turbidity Units.
Properties	A registered customer connection to the drinking water supply.
RMP	Risk Management Plan
SCADA system	Supervisory control and data acquisition system
SDWA	*Safe Drinking Water Act 2003* Act No.46/2003.
SDWR	Safe Drinking Water Regulations 2005 S.R No.88/2005.
Source Water	Raw water supply for town, prior to treatment.
THM	Trihalomethane.
WTP	Water Treatment Plant.
100mL	100 millilitres.
<	Less than.
>	Greater than.
≤	Less than or equal to.
≥	Greater than or equal to.
<1 MPN/100ml	Reporting for *E. coli* where the detection limit is less then 1 most probable number of *E. coli* organism per 100ml.

14 FURTHER INFORMATION

Customers and members of the public may access drinking water quality data by contacting Gippsland Water on 1800 066 401 or visiting www.gippswater.com.au.

15 REFERENCES

National Health and Medical Research Council. *Australian Drinking Water Guidelines 2011.*
Web address www.nhmrc.gov.au

Department of Health *2012-13 Annual report format - Drinking Water Regulation Guidance Note 12 June 2010*

Safe Drinking Water Act 2003 No.46/2003

Safe Drinking Water Regulations 2005 S.R No.88/2005

Code of Practice for Fluoridation of Drinking Water Supplies *Health (Fluoridation) Act 1973* Department of Human Services (March 2009)

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APPENDIX 1: RAW WATER MONITORING

<table>
<tr><th rowspan="2">Locality</th><th rowspan="2">Source water</th><th colspan="3">Nature of Other Raw Water Monitoring Programs</th></tr>
<tr><th>Weekly/Fortnightly</th><th>Monthly</th><th>Annual / Quarterly</th></tr>
<tr><td>Morwell
Churchill
Yinnar
Jumbuk
Boolarra
Traralgon South / Hazelwood North</td><td rowspan="3">Moondarra Res via Tyers River</td><td rowspan="13"><u>Physicals</u>
• Absorbance (254nm)
• Colour True (465nm)
• Dissolved Oxygen
• SUVA (245nm)
• Turbidity
• Electrical Conductivity @25^{o}C
• pH

<u>Microbiological</u>
• Escherichia coli
• Total Coliforms
• Heterotrophic Plate Count</td><td rowspan="13"><u>Physicals</u>
• Alkalinity Bicarbonate as $CaCO_3$
• Alkalinity Total as $CaCO_3$
• Dissolved Organic Carbon (DOC)
• Total Organic Carbon (TOC)
• Total Dissolved Solids (TDS)
• SUVA (245nm)
• Chlorophyll a

<u>Chemical Inorganic</u>
• Ammonia as N
• Bromide
• Chloride
• Fluoride
• Nitrate as N
• Nitrite as N
• Organic Nitrogen as N
• Phosphorous, Reactive as P
• Phosphorous Total as N
• Sulphate
• Total Kjeldahl Nitrogen as N
• Total Nitrogen as N</td><td rowspan="13"><u>Physicals*</u>
• Total Dissolved Solids (TDS)
• Suspended Solids

<u>Chemical Inorganic</u>
• Cyanide
• Dissolved Organic Carbon (DOC)
• Total Organic Carbon (TOC)
• Bromide
• Fluoride

<u>Metals*</u>
• Aluminium Total
• Arsenic Total
• Selenium
• Cadmium Total
• Copper Total
• Lead Total
• Mercury
• Zinc Total

<u>Pesticides, Herbicides and Chemical Organics**</u>
• 2,4,5 T (Herbicide)
• 2,4,5 TP (Silvex)
• 2,4,6- T
• 2,4 D
• 2,6 D
• 2,4 DB
• 3-Hydroxy Carbofuran
• 4-CPA
• Aldrin
• Aldicarb
• Ametryn
• Asulam</td></tr>
<tr><td>Traralgon</td></tr>
<tr><td>Tyers/Glengarry
Rosedale
Cowwarr
Toongabbie</td></tr>
<tr><td>Maffra</td><td rowspan="3">Macalister River</td></tr>
<tr><td>Stratford</td></tr>
<tr><td>Boisdale</td></tr>
<tr><td>Briagolong</td><td>Bore (Freestone Creek Aquifer)</td></tr>
<tr><td>Warragul (including Nilma, Darnum, Drouin East)</td><td rowspan="4">Pederson Weir (Tarago River)
Tarago Reservoir - (supplementary supply)</td></tr>
<tr><td>Warragul South</td></tr>
<tr><td>Drouin</td></tr>
<tr><td>Rokeby/Buln Buln</td></tr>
<tr><td>Coongulla/ Glenmaggie</td><td>Macalister River</td></tr>
<tr><td>Rawson</td><td rowspan="2">Trigger Creek</td></tr>
<tr><td>Erica</td></tr>
</table>

Locality	Source water	Nature of Other Raw Water Monitoring Programs		
		Weekly/Fortnightly	Monthly	Annual / Quarterly
Heyfield	Thomson River		**Metals** • Aluminium Total • Arsenic Total • Calcium Total • Cadmium Total • Copper Total • Iron Total • Iron Soluble • Lead Total • Mercury • Potassium • Magnesium • Manganese Total • Manganese Soluble • Selenium • Zinc Total **Chlorophenols (Sale Bores Only)** • 2,3,4,5 Tetrechlorophenol • 2,3,5,6 Tetrachlorophenol • 2,4-Dichlorophenol • 2,6-Dichlorphenol • 2-Chlorophenol • 4-Chloro-3-Methylphenol • Total Phenols (Halogenated) • Pentachlorophenol • 2,4,5-Trichlorophenol • 2,4,6 Trichlorophenol	• Atrazine • Azinphos-ethyl • Azinphos-methyl • Bendiocarb • Benomyl • Bentazon • BHC (alpha) • BHC (beta) • BHC (delta) • Bifenthrin • Bioresmethrin • Brodifacoum • Bromacil • Bromophos-ethyl • Bromoxynil • Bupirimate • Carbaryl • Carbofenothion • Carbofuran • Chlordane (cis) • Chlordane (trans) • Chlorfenvinphos • Chlorsulfuron • Chlorothalonil • Chloropyrifos - methyl • Chlopyralid • Coumaphos • Cynazine • Cyfluthrin • Cypermethrin • Lambda-cyhalothrin • Cyprdinil • Cyproconazole • Cyromazine • 4,4-DDD • 4,4-DDE • 4,4-DDT • Deltametrhrin & Tralmethrin
Mirboo North	Little Morwell River			
Moe	Tanjil River and Narracan Creek			
Newborough				
Yallourn North				
Trafalgar				
Yarragon				
Neerim South	Tarago River			
Noojee				
Sale/Wurruk	Bore (Boisdale Aquifer)			
Seaspray	Merrimans Creek			
Thorpdale	Easterbrook Creek			
Willow Grove	Tanjil River			

Locality	Source water	Nature of Other Raw Water Monitoring Programs		
		Weekly/Fortnightly	Monthly	Annual / Quarterly
				• Demeton-O • Demeton-S • Diazinon • Dicamba • Dichlofluanid • Dichlorprop • Dichlorvos • Deildrin • Dinoseb • Diclofop-methyl • Dichloran • Difenoconazole • Diflufenican • Dimethoate • Dimethomorph • Diquat • Diphyeylamine • Disulfoton • Diuron • Endosulfan (alpha) • Endosulfan (beta) • Endosulfan Sulphate • Eldrin • Eldrinaldehyde • Endrin Ketone • ENP • Ethion • Ethoprophos • Fenamiphos • Fenerimol • Fenchlorphos (Ronnel) • Fenitrothion • Fensulfothion • Fenthion • Fenvalerate & Esfenvalerate • Fiprinol • Fluroxypyr • Fluometuron

Locality	Source water	Nature of Other Raw Water Monitoring Programs		
		Weekly/Fortnightly	Monthly	Annual / Quarterly
				• Flusilazole • Fluvalinate • Glyphosate • HCB • Heptachlor • Heptachlor Epoxide • Haxazinone • Hexaconazole • Imazalil • Iprodione • Irgarol • Lindane • Malathion • MCPA • MCPB • Mecoprop • Methylaxyl • Metolachlor • Methiocarb • Methomyl • Methoxychlor • Metribuzin • Mevinphos • Molinate • Monocrotophos • Omethoate • Oryzalin • Oxamyl • Oxychlordane • Oxyfluorfen • Paclobutrazole • Paraquat • Parathion (methyl & ethyl) • Penconazole • Pendimethalin • Permethrin • o-Phenylphenol • Phenothrin

Locality	Source water	Nature of Other Raw Water Monitoring Programs		
		Weekly/Fortnightly	Monthly	Annual / Quarterly
				• Phorate • Picloram • Piperonyl Butoxide • Pirimiphos-ethyl • Pirimiphos-methyl • Prochloraz • Procymidone • Profenofos • Prometryn • Propachlor • Propiconazole 1 • Propiconazole 11 • Propazine • Prophos • Propiconazole • Prothiofos • Pyrimethanil • Simazine • Sulfotep • Sulprofos • Tebuconazole • Temephos • Terbuthylazine • Terbufos • Tebuthiuron • Terbutryn • Tetrachlovinphos • Tetraethyldithiopyrphos • Thiamethoxam • Thiobencarb • Thiodicarb • Triazophos • Trichlorfon • Trichloronate • Triclopyr • Trifluralin • Tukuthion • Vinclozolin

Locality	Source water	Nature of Other Raw Water Monitoring Programs		
		Weekly/Fortnightly	Monthly	Annual / Quarterly
				Radiological • Gross Alpha Activity • Gross Beta Activity **Microbiological** • *Cryptosporidium spp* • *Giardia spp*

*Reduced frequency of monitoring in some catchments based on risk profile
** Note all Pesticides, Herbicides and Chemical Organics results were within recommended ADWG limits
Not all parameters were measured at all localities or source waters.
Purpose of Monitoring - Risk Management within Catchment and Raw Water Supply Systems
Comprehensiveness (Frequency) – Weekly, Fortnightly, Monthly, Quarterly and Annual Monitoring or as Risks Identified